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REPORT OF BOARD

OF

ILLINOIS STATE FISH COMMISSIONERS,

TO THE

GOVERNOR OF ILLINOIS.

SEPTEMBER 30, 1886.

SPRINGFIELD, ILL.:
H. W. ROKKER, PRINTER AND BINDER
1886.

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REPORT.

To His Excellency, GOVERNOR RICHARD J. OGLESBY:

We beg leave to submit herewith our report as Board of State Fish Commissioners, from October 1, 1884, to September 30, 1886.

In former reports we have detailed at length our methods of taking and distributing the young native fish, and as they differ but slightly from season to season, it is hardly necessary to again go over them.

As a matter of course, the season has much to do with a successful showing. The season of 1885 was a very fortunate one for our work, the water rising quite early, enabling us to get at work thirty to forty days earlier than ordinarily. The catch of fish was very satisfactory, and the character of the fish taken, as to quality, far above the average. The young black bass were, perhaps, never so plenty, showing an increase of from twenty-five to fifty per cent. over any former season during our work. Ringed-perch showed a wonderful increase and demonstrated their remarkable reproductiveness. Five years ago we placed in the Mississippi river, at several points, the young fry of perch taken from Lake Michigan. In the season of 1885 the product of such planting numbered hundreds of thousands. These, in the progress of our work, were placed in our interior streams and lakes, and will doubtless soon populate these waters with a comparatively new and desirable game fish.

As before stated, that season was all we could ask for in our work, and we pushed it to the utmost limit permitted by our appropriation.

Pickerel began making their appearance in liberal numbers along the Mississippi river, and were quite welcome, too, as for fifteen years previous but few, if any, had been taken, either with hook and line or nets. These were largely the product of a planting made in 1880-1881 from the spawn taken from the lakes of Northern Illinois and Wisconsin.

They differ in character somewhat from those formerly native to our waters. They have afforded, since their planting, an addition to the sport of the hook and line fishermen, and have added materially to the revenue of the market fisherman; this season (1886) a number having been caught weighing as high as six pounds, and numberless strings of ten to fifteen have been reported weighing from one to three pounds. They have naturally found their way into all our lakes and streams tributary to the Mississippi river, and have added, we think, permanently a valuable acquisition to

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our waters. This will also be true of many of our inland streams, as from the product of such planting we have distributed liberally the young fry throughout the State, and reports are quite frequent of fish of this variety and of fair size being taken.

We found considerably less opposition to our methods than in former seasons. At first we were frequently molested and considerable fault found on account of the fact that we were taking fish from this section to take to others, it being alleged by people along the river that we were depriving one part of the State of fish to benefit another; but an examination and explanation of our work showed that, instead of being a detriment to the section in which we were working, we were, as a matter of fact, making the rivers and lakes in the vicinity of which we worked, the flats and sloughs, richer by far in quantity of fish than if they were left to perish, as they must have done, by drouth or winter, if not taken out and cared for.

Only a small portion of the fish so caught could be successfully used for transportation. As the catch would often aggregate hundreds of thousands daily in early season, such, of course, as were not used for distribution were at once placed in the nearest deep water, and added very materially to the future supply for either rod and line or net. The angler found better sport than had been the case for many seasons previous, and large strings were the order of the day. Better fish and better qualities were taken from all the old grounds, which for many previous seasons were pronounced "played out."

In this connection we wish to say that one great evil, which has much to do with reducing our fish supply, is the practice of catching large strings of bass and croppie too small to eat, averaging not over four inches in length for bass and three for croppie. These, which a true sportsman would at once throw back when taken, are left to die on the banks or carried away, only to be ultimately thrown aside as worthless. It is an unwarranted destruction of fish, and when the number so taken is considered it is readily seen that it must be equally destructive in its effects as are many of the methods used by seine fishermen. As before said, no one who has any of the elements of a sportsman would keep such fish, and our attention has frequently been called to the practice by the market fishermen themselves, as a practice as detrimental to the interest of preservation and protection of fish as any against which we were trying to legislate for in their instance—in trying to prevent the destruction of young fish. It might not be deemed practicable, but it certainly would result in great good if some means could be provided, either by enactment or education, to prevent the practice. Bass and croppie take the bait when very young, oftentimes before they are but little larger than the bait offered them. The practice of taking the young fish with hook and line cannot but create a bad impression in the minds of the fishermen, whom we hope to educate up to the idea that a protective law and prohibition of the use of the seine for a time is intended and calculated to benefit them, as well as others, by a material increase of fish. It will be a difficult problem to solve, but the fact that it is a great and growing evil cannot be denied. At Murdock Lake, the headquarters of one of the

largest fishing clubs of this State and Missouri, a limit as to size fish allowed to be taken is made, and no one is allowed to take fish off the premises of less than the specified size—the standard of length being, we think, seven inches for bass and six for croppie. Other clubs will doubtless fall into line and exact compliance with the same or similar rules and regulations; but there yet remain those outside of such associations who find their way into every nook and corner, so to speak, and catch anything and everything that will take the bait offered, ruthlessly destroying fish too small to eat, which could be put back immediately with but slight risk of having been damaged by the hook. The number who "go a-fishing" is much larger than most people imagine, and the love of the sport is greatly on the increase, too. On one day, it has been estimated by competent judges, at least two thousand people went from one point to indulge in the sport, and it was not the day set aside for fishing by Christian communities, either. When the number of young fish destroyed by this means is added to the wholesale slaughter by seine fishing, it would seem sufficient to convince anyone of the urgent need of good protective laws and increased means for propagating and distributing fish to replenish depleted streams, and meet not only the usual demands upon our waters, but the increased interest in hook and line fishing and the growing demand for fish as food as well.

FISH DISTRIBUTED.

The character and variety of fish distributed in the season of 1884–5 differed but little from former distributions, and consisted largely of game fish, such as both varieties of black bass, pickerel, wall-eyed pike, croppie, goggle-eye or rock bass, ringed perch, striped bass, and a limited number of catfish and sunfish. And while all of them were native to the waters of the State generally, yet when put into new lakes or depleted streams did not seem to thrive in some waters as well as in others. An inquiry and investigation as to causes of difference, has demonstrated, we think, beyond question that it is as essential to furnish food for the fish as to restock the streams. Acting upon such conclusion, for the past season we have pursued the policy of distributing the fish just as they were taken, not sorting so closely as was the rule previously. So that in planting with the game or predacious fish the softer-rayed or commoner varieties, we not only stock streams, and expect an increase from the fine fish, but plant, as well, an ever-increasing supply of food for them. This conclusion was not reached until after the subject had been fully investigated and demonstrated by comparative experiments. The President of our Board, Mr. N. K. Fairbank, at his summer home on Lake Geneva, owns and maintains a fish farm of huge proportions, and has for a number of years, in conjunction with other residents of that vicinity, caused to be hatched and turned into the lake large quantities of the salmon trout yearly. After a sufficient lapse of time an effort was made to find, if possible, some of the results of such planting; but the search was futile, not one being taken, although every effort was used to obtain a fine idea as o what the lake contained. The cause of the failure to stock the lake with this variety was undoubtedly owing to a lack of proper

food for the young fish; although the water was seemingly in every way adapted to the wants of the fish, being similar to that of the great lakes and in extent sufficient, with ample depth, etc. Mr. Fairbank, at a meeting of the American Fisheries Society, made a statement as to his experiment, and we give it herewith. As such costly experiments are rare, the gentleman having expended about $15,000 in the work, we have no doubt the benefit of such experience will be appreciated:

"Mr. President and gentlemen, I thought it might be of interest to say a word or two to the gentlemen here in relation to the matter of planting fish in waters where they are not indigenous. We have made very great strides in artificial propagation of fish, and have mastered all the difficulties of hatching fish, procuring the eggs, hatching and obtaining the young fry; and a great deal of work and a great deal of money has been expended in planting fish in various waters in all of the States. We started off with a degree of enthusiasm eight or ten years ago that was worthy of a better outcome than we have had, but it was done with more zeal than wisdom, I think. We have planted shad, for instance, in the Calumet river here, which empties into Lake Michigan, and we have planted trout in the Kankakee river and brook trout in the streams of Iowa, and lake salmon in all the little lakes in Michigan and Illinois; and wherever there was a little stream we thought at that time all we had to do was to hatch the fish and put the young fry in there, and we should have an abundance of fish.

"It is needless to say, at least I have not heard of any instance where any of these efforts have been successful. I was anxious to demonstrate the fact and I decided to make an experiment in Lake Geneva, Wisconsin, which I did on a large enough scale to demonstrate thoroughly whether it was practicable. Lake Geneva is a lake about eight miles long and from half a mile to three miles wide. It is a very pure body of water as blue as Lake Michigan. It is 185 feet deep I have found in some places, but it averages 100 feet deep all over; bold shores and very clean.

"There is not a bulrush or lilly pad in the Lake, and in every way it is particularly adapted to the salmon trout because it seemed in all its characteristics just like the small lakes of New York State in which the salmon trout are indigeneous—Canandaigua Lake, Cayuga Lake and several of the lakes there. Not feeling sure about it I wrote to Mr. Seth Green, who was an old friend of mine, to come out and spend a week with me, which he did, because I wanted his judgment in the matter, and we sounded the lake and found the depth of the water and we dredged the bottom. We caught all the small varieties of fish to see what food there was for the salmon trout. Lake Geneva is somewhat celebrated for abounding in the small fish known as cisco. They are in that lake and one or two other small lakes in Wisconsin, and they are there in great abundance, living in deep water. The cisco is the natural food of the lake trout, and we therefore very naturally came to the conclusion that Lake Geneva was particularly adapted, if any lake on the face of the earth was, for planting and growing the Mackinaw trout, or lake trout; so I built a hatching house and I employed one of Mr. Green's men, Mr. Welcher, who was afterwards superintendent of the Wisconsin fish hatching establishment, and

went to work. The first year I bought the eggs from the New York State Commission, 200,000, and after that Mr. Welcher went every fall to Lake Michigan and took the supply of eggs. I have laid in about 500,000 each winter, and I pursued that faithfully and put in about 500,000 good healthy fry in the lake every spring for five years, but I have never seen, and no one else, as near as I can find out, has ever seen the shadow or sign of a salmon trout in Lake Geneva, large or small. The question is asked, where are they? Well, they are not there. Mr. Green said: "They are there but you do not know how to fish for them. They are in deep water." "Well," I said, "you come out and spend another week with me and we will fish for them." He said he was not able to come, but replied, "I will send my son out." I offered to pay all his expenses and his son came out. I think that was two years ago, and he spent a week with me and we spent the week fishing faithfully in the deep water with Mr. Green's methods, with a heavy sinker and leaders, and we fished the lake thoroughly, and Mr. Welcher came down with some gill nets; that was three years ago. We set gill nets across the lake in four or five different places and followed that up for a week, and we never took or saw one sign of a salmon trout. Now, the reason of it is this, and that is the reason I call the attention of you gentlemen to it. It is a subject we have got to look at fairly, and it is the main thing in planting fish, and that is, what food is there in the waters where you propose to plant the fish for the young fish or fry? Salmon trout would live in Lake Geneva if they could come to maturity. The cisco is there in great abundance and furnish a most excellent and natural food--the fish that they live on in Lake Michigan; but in looking at it I was satisfied that all the young fish died. The fry starved to death because their food was not there.

"Now, in looking at it you will see what the trouble is. The salmon trout breed in the great lakes wherever there is a reef, and there you catch them in three, four or five hundred feet of water, or less; wherever there are extensive reefs of rock, there the gill nets are set and there the salmon trout are taken. Here are the Racine reefs; you sail over those reefs any time in the summer and throw out a trolling line and you will take salmon trout. My theory of it is that on the face of that rock there is some animal life, animalculæ, that the young fish stick their noses in and feed on until they are old enough to eat other fish. Lake Geneva has no reefs of rock. Where there are stones at all it is a boulder bottom, or it is a mud bottom, earth and clay covered largely with leaves. It is surrounded to a great extent with timber and the leaves blow in every year. You try it and you will find on the bottom of Lake Geneva simply a layer of dead leaves, so there is evidently nothing there for the young fry to feed upon and the fry have all died, and that has been the case in hundreds of other instances. I have sent them to Crystal Lake. Mr. Dole, who lives there, is a friend of mine, and I have sent several hundred thousands for two or three years. I always gave him a lot to put in there. That is a small deep lake of perhaps three or four thousand acres, very pure water and very clear, but there never has been a young fish seen, and I think it is money and work thrown

away, and that it is utterly useless to hatch fish and put them in waters unless we know to a certainty that the food for the young fry is there. I made still another experiment in the same line by going into one of the neighboring lakes near by in Wisconsin, and taking a large amount of the spawn of the wall-eyed pike. I brought those down and hatched millions of them and put them into Lake Geneva, and there never has been a wall-eyed pike seen there. Evidently there is nothing for those young fish to live upon. They breed and live and thrive where all the conditions are right for them, or in trout lakes where they are indigenous, and there is something for the young fish to live upon. You may take the fry and put them into water where there is no food for the young fish, and you will never have any result. This is a thing we might as well look in the face and understand that it is useless work. Now, see the work of the Iowa Commission, and they did a great deal; they took a great deal of spawn, salmon trout, I don't know where they deposited them—all over Iowa—but I have yet to learn that one has appeared. The same way I did with white fish. I took about an equal number of white fish as lake trout, taking the spawn the same time of year and hatched about as many. I suppose I put into Lake Geneva 2,500,000 both of white fish and lake trout. I was determined to make the experiment thorough enough to demonstrate that one question, whether these small lakes could be stocked with the better classes of food fishes where they were not indigenous to the waters. I knew that of course by putting a few thousand in a lake occasionally, or every year, five to ten or twenty thousand was not enough to demonstrate it. They could easily be destroyed; but by putting enough in, piling them in year after year, it would demonstrate it, and I spent ten or twelve thousand dollars in the experiment. I think this is a question that is very vital for us to consider in our work hereafter—what there is in the waters where we propose to put fish for the young to live upon, and I apprehend there is not much to be gained in trying to plant fish in waters where they are not indigenous, or where they have not been some time.

"I also procured from Prof. Baird and hatched perhaps half a million of California salmon the same seasons that I was hatching the others, which I deposited in the lake; but there is a little stream entering Lake Geneva—the lake is fed by springs. There is really no inlet to it except the springs around it, but at the upper end of the lake there is about a mile of low land, and the springs running down through make a little creek. I deposited the young California salmon in those little streams—little springs—and they ran down into this creek. Some of them I kept—perhaps fifty to one hundred thousand. About half of the amount I hatched I kept from the streams until they were yearlings and then turned them out, and we have taken occasionally a California salmon, but they are not at all plenty. For the last two years there has not been any taken. Three years ago a boy took one, a very fine fish which weighed twelve and three-quarter pounds, as handsome a salmon as I ever saw anywhere, showing that salt doesn't enter into the question at all as to the life of a salmon; that they will grow just as well in fresh water as in salt if they have enough to eat.

"There is an abundance of food there, and the California salmon are a very hardy fish. I have no doubt if I had put as many California salmon into Lake Geneva as I did salmon trout, we would have had more of a result from it, still I don't apprehend that they would do much. I think in a lake of that size and purity of water, and with all the food there for the maturing of fish, the California salmon might be made to flourish if we had two or three miles of gravel bottom stream in which they could spawn. I found in this little stream which runs up through the marshy meadow, very low ground—it is only a small stream, and the bottom is mud and the water is very cold but sluggish—I found in there one day four or five large salmon that would run eight to ten pounds, splashing around up in there (it was evidently their spawning season) looking for a place to spawn; but if they did lay their eggs they sank down in the mud and were lost. There is no place for them to hatch. I couldn't get any spawning ground for them.

"I also made an experiment in brook trout in these little streams (springs) around those hills, and in this creek running down there, and established a fish farm up there, quite a trout pond, and stocked this little stream. This is eminently successful, because in the stream the weeds and growth in the bottom are alive with the natural food of the brook trout, the little fresh-water shrimp, and now that mile and a half of stream running through this marsh is full of brook trout, as fine trout as I ever saw. In fact I never saw fatter and finer brook trout than I find in there. I can go in there any time and take twenty-five or thirty trout in an hour or two. That experiment has been eminently successful because the food is there for the fish. I thought I would give you gentlemen the benefit of my experience. I have never written anything about it because it was a good deal of a question in my mind whether I ought to do it, and whether I ought to discourage the attempts that might be made, but I am so thoroughly satisfied that it is utterly useless, that I think it should be made public."

Along the Sny levee are found quite a number of large, deep and clear ponds, formed by breaking of the levee, the water coming through the breaks in such force as to cut deep and wide gulches across the land adjoining. When the levee was repaired the owners of the land, in order to get from one portion to another, filled a road across them, which, acting as a dam, soon caused a pond or lake to form from the siepage of water through the sand, or from surface water. These ponds were, of course, free at the time from fish of any kind.

After the break in 1880–1881, while working the levee pits outside of the levee, gathering the young fish for distribution, we caused to be put into one of the deepest of these lakes a number of thousands of the young bass only, as they were gathered, and into the others, as we came to them, quantities of the fish just as they were taken. In the lake where the bass only had been placed we note some very fine specimens of bass, but few of them, and the young quite scarce. In the ponds into which we placed the fish of all kinds, just as they were taken, we found just as good fish in size, and plenty of the young of all varieties, and constantly increasing. In view of

these facts, and the result of similar experiments by others, we have adopted the method, as mentioned before, of planting the fish just as they are taken, all varieties together, which, after all, is but following nature's methods more closely than in undertaking to raise the standard by planting only the better and gamier varieties.

PONDS FOR FISH.

The building of ponds for both native fish and carp has been much stimulated by the success of those earlier in these experiments, and in all parts of the State demands for stock are constantly being made. Reports of the ponds stocked two and four years ago are very encouraging. Even the fact that one of the hardest and coldest winters, followed by a phenomenally hot summer, and the consequent loss of fish by freezing and drought, has not, we are glad to state, interfered with present and prospective plans for a continuance of such work. The ponds built during the past two years, and those now under process of construction, are, as a rule, an improvement on those previously constructed. Experience has taught many lessons, and among them this: that fish, like everything else, are successfully cultivated just in proportion to the care used in preparing a proper place for their reception, and the means used in feeding and caring for them. We would, if space permitted, be pleased to give a list and description of such lakes, built or improved, for the reception and cultivation of native fish in this State. The number is, however, too large to undertake it. Each pond or lake built and successfully maintained, however, only adds to the interest, and the example is rapidly followed by others.

FISHING CLUBS.

Aside from the artificial lakes and ponds constructed and protected, we are pleased to note a growing appreciation of the value of the thousands of acres of land and water along the Mississippi and Illinois rivers as preserves for fish and game. Many hundreds of acres have, during the past two years, been fenced in, and good and comfortable club-houses erected, controlled by clubs, the fish carefully protected, and in many instances a rule fixing a limit as to size of fish allowed to be taken rigidly enforced.

A number of these clubs report to us favorable results following the plant furnished them by the Commission. Varieties of fish which, previous to such planting, had been either extinct or very scarce, are being caught in fair numbers and of fair size. The interest manifested by the fishing clubs in a rigid enforcement of existing laws, and a desire to aid in obtaining better ones, as expressed by their correspondence, is very flattering, and we are glad to report good work done by them, and desire to thank them for much valuable assistance in our work.

OUR WORK.

Of the value of the work done in the distribution of native fish, we have, we think, practical demonstration. It has been our endeavor to make the distribution as general and effective as possible

with the means at our disposal. Whenever a stream is crossed by a railroad, or a lake near such road can be reached, we have instructed that such streams be stocked with the young native fish.

The winters of 1884–5 were so extremely severe as to have become matters of history. As a consequence, great damage was done to fish. Ice very thick, covered with a heavy blanket of snow, and for such long periods, could not be otherwise than most disastrous to fish. We inspected in the spring following the winters named quite large lakes, where, judging from the dead fish in sight, everything in the lake had perished. Last winter was followed by an unusually hot summer and long season of drouth, causing a great number of the lakes, sloughs, etc., to dry up, and make work plenty for our little party. We have been quite severely criticised for the great loss of fish, the press in some sections claiming that proper attention to the drying sloughs and ponds had not been given by the Commission, and that a greater number of men should have been employed to prevent so great a loss by the rapid drying up of the lakes. We can only say we did what we could. Our State has a river frontage, taking the meandering course of the Mississippi into consideration, of about five hundred miles, its valley filled with lakes and sloughs, and to have successfully saved and transplanted the millions of fish that perished during the recent summer would have taken thousands of men and hundreds of thousands of dollars, and have then been only imperfectly accomplished, as with the thermometer showing 120 in the sun, in some places when gangs were at work it was with the utmost difficulty that fish were carried even a quarter of a mile from the slough when taken to the nearest deep water, without great loss. Some idea may be had of the difficulty experienced and the great care necessary to be used, when fish had to be transported long distances to shipping point, and then by rail to interior points, twelve to twenty-four hours often necessary to complete trip. These seasons, however, do not come often, but when they do they in turn, we think, furnish additional argument in favor of greater and more effective means being provided to gather, save and utilize such fish as nature furnishes us from her great hatching houses, and puts, as it were, at our feet to take and use. This, of course, could be had to a largely increased extent were sufficient means at our disposal.

The lakes, ponds and low places along the larger rivers were not the only ones affected by the drouth, many of the smaller streams drying up completely, and others getting so low as to kill the fish. We have seen the bottoms of sloughs and large watercourses dry and dusty this season, that during a knowledge of many years standing have never before seen less than two to two and one-half feet of water in before.

The fish in private ponds throughout the State suffered greatly, and quite a number of those cultivating fish report a loss, many having applied for a supply of fish to restock, feeling quite encouraged by the showing made previous to losing the fish, and not at all discouraged by such loss.

It has been quite a difficult matter to successfully transport the native fish this season, even with the greatest care and with addi-

tional precautionary measures, and owing to the extreme hot weather and consequent weakening effect on the fish, both in transit and while in the waters. The loss in transit has been great, but while this is true, the work of saving and placing them in deeper water, in the vicinity of our work, has been carried on to a much greater extent than during any previous season.

CARP.

Since public attention has been called to the subject of fish culture, as a means of forming an important addition to the food producing resources of the farm, no other fish has attracted so much attention as the carp. It has furnished a series of surprises from its first introduction. The first and greatest, perhaps, is the ease with which it adapts itself to the waters of the different sections of the country. Of no other fish with which experiments have been made has so much been written. In our opinion they are of great value to the country as a food supply. Though there has, of course, been a great deal of adverse criticism regarding them, it has been, in our opinion, caused either by ignorance of their merits or by erroneous opinions gathered from the experience of some who have undertaken to raise them without supplying the necessary conditions for their successful cultivation. They can not grow and thrive without care and food any more than can any other kind of stock, and just in proportion to the care given them will the fish culturist be compensated for his outlay. An ordinary farm pond may supply the necessary conditions to keep carp alive, but it requires something more than an ordinary farm pond to raise them with success and profit. Every farmer may be able to raise carp, to a limited extent; but every farmer is not in a position to receive the full benefits of their naturally rapid increase in numbers and size, unless he has made the provision for their cultivation that he would expect to make were he intending to raise any other kind of stock, with a view to receiving the most profit possible for his outlay. In view of the wide range of opinion regarding the merits of these fish, we caused postal cards, enclosed in circulars explaining our purpose in making inquiries, to be sent to a large proportion of those in this State who had been supplied with carp, through our Commission, during the past two seasons, with a view to getting at, as nearly as possible, the facts. Owing to the large number of the replies, it would be impracticable to give each in detail. We have tabulated them, however, and give the average:

Number of circulars issued	3,200
Number of replies	2,933
Number reporting favorably	2,618
Number reporting loss	318
Average length	10½ inches
Average weight	2½ pounds
Number reporting increase	936

This estimate gives us a total of 320,000 pounds of carp, as the increase of one year, from those heard from. When the fact is considered that many have had carp ponds in successful operation

for five years, and that the increase from the increase even now is reported, it will be safe to assume that the increase in the food supply from this source will aggregate for this year 2,000,000 pounds, and since their introduction fully 5,000,000. The increase will, of course, be much larger each year, doubling rapidly as the young fish begin to fill the ponds. The carp is a great reproducer, and in large ponds, where proper care is given them, the number of young produced from twenty breeding carp is almost fabulous. We instance one man, Mr. Worthy Frost, in Adams county, who, from a pond covering one-third of an acre, has since the fall of 1882 sold $3.6 worth of carp. Throughout the State there are now quite a number of carp culturists who are raising carp for sale, and are, so far as we can learn, selling the product readily. As to the extent of this industry we have not gathered sufficient reliable data to base figures upon, but that it is large and will increase the amount of food produced greatly, we have no reason to doubt. The carp, as a rule, spawn at two years of age, though instances of an earlier increase are not rare. One instance might be mentioned which came under the observation of the writer. In May, 1886, I purchased of Mr. Worthy Frost, of Fowler, Adams county, thirteen carp three years old and fifty yearlings, to put into the Park fountain at Quincy. On getting them to Quincy we found the water in the fountain had not been turned on, so were compelled to put them in a live-box in the Quincy Bay. After the lapse of a day or two water was turned on in the fountain, and we took up the live-box, and found that in their struggles the three-year-old carp, being quite large and strong, had broken out. One, however, had got caught in the aperture, which prevented the rest getting out. We found in the box one three year old, (a male), and six yearlings. These we put into the fountain basin, quite disappointed at our loss, as for several years we had bred quite a number in the fountain, which served the purpose of affording pleasure and amusement to visitors, as well as increasing the supply. Sometime in July the park policeman, who fed them daily, meeting the writer in the street, said: "There is quite a number of young fish in the basin. I wish you would come over and see them; I believe they are young carp." I replied that that was impossible, as there was but one large fish there, and that a male, but would go over and see them. Judge of my surprise when I found thousands of young carp there from one and a half to two inches in length, the product of carp then only one year old. The young will now aggregate many times more in weight than the original fish, and of extraordinary size for their age, five to six inches in length. The carp were taken out and loaned to the Inter-State Industrial Exposition at Chicago, where they now are. Since the above mentioned experience we have not been so ready to doubt the statements of quite a number who have repeatedly written us that their carp had spawned at the age of one year.

THEIR ADAPTATION TO RIVERS.

Last season the first experiment was made of stocking the rivers of Illinois with carp. The United States Fish Commission gave the State a car-load of carp, and sent their car No. 3 in charge of J.

F. Ellis to this State to distribute them under the direction of the State Fish Commission, which was accomplished, by placing them as follows:

Okaw River	3,000
Saline River	2,000
Little Wabash River	2,000
Big Muddy River	2,000
Sangamon River	2,000
Clear Lake	500
Illinois River	5,000
Rock River	2,000
Fox River	2,000
Kankakee River	3,000
Lincoln Park lakes, Chicago	1,600
South Park lakes, Chicago	1,000
Des Plaines River	1,000
Reservoir Illinois C. R. R., Clinton	200
C., B. & Q. reservoir, Mendota	200
Edwards River	1,000
Quincy Bay	2,000

This, with a supplementary shipment, was the gift of the United States Commission to the State of Illinois, as well as the expense of the car and crew, engaged in the distribution. Car came into the State over the Indianapolis and St. Louis R. R. to Vandalia, from which point fish for Okaw, Big Muddy, Saline and Little Wabash Rivers were sent by express. Car came over Illinois Central R. R. to Springfield, where the Sangamon River and Clear Lake were stocked, car laying over there one day. From Springfield via Illinois Central R. R. to Clinton, where the reservoir was stocked. Thence to LaSalle, where plant for Illinois River was made. From there to Mendota, stocking the C., B. & Q. R. R. reservoir. From Mendota the fish for Rock River were sent to Dixon. Car then went over C., B. & Q. R. R. to Aurora, planting Fox River. Then to Naperville for the Des Plaines River, reaching Chicago at night. From Chicago fish were sent to Kankakee for Kankakee River. Lakes in Lincoln and South Parks were supplied from Chicago.

Of this planting we have not as yet had any report, but that carp will thrive in our rivers, has, we think, been demonstrated beyond a question. About Sept. 10, 1886, Messrs. Schrall & Boles, of Meredosia, telegraphed to the writer, at Quincy, that they had caught a large carp in the Illinois River near Meredosia, that it was alive, and if we wanted it to send for it. I at once sent a message and case for it. On its arrival, I found it to be a mirror carp, measuring 30½ inches in length, and weighing 15½ pounds. The week following another telegram arrived from the same source, telling of another large carp, which, upon arrival here, proved to be almost identically of same size and weight as the other, weighing one-half pound more, and about same length. Both fish are now in the basin of the park fountain at Quincy, and have grown quite perceptibly since their arrival. These fish, no doubt, had escaped from some ponds connected with some stream tributary to the Illinois River, and perhaps by the carrying away of the dam to carp pond, during a freshet, the fish became liberated and

found their way to the river. From Smith & Co., of Beardstown, and fishermen at Havana, Pekin, Peoria, and various points on Illinois River, reports come to us of the catching, now and then, of carp, all quite large. On the Mississippi River carp are frequently taken, both the old and young, showing that they not only grow in the rivers, but increase as well. In the Sny Ecarte, in Pike county, we are informed that some seine fishermen caught at one haul of the seine about 100 carp, averaging in weight about 3 pounds each. This catch was reported to us by the fishermen themselves. We did not see the fish and the statement may be erroneous, but enough has been learned in regard to the matter to demonstrate to our satisfaction that the carp can be successfully introduced into our rivers, and with that end in view we shall undertake to propagate a supply, which, together with those furnished from time to time by the United States Fish Commission, shall be adequate to people all the streams in the State with them.

CARP DISTRIBUTION.

Aside from the distribution before mentioned in rivers of the State, a very large number have been supplied this as in former seasons, to applicants for ponds. We give in the appendix a list of those supplied, together with location, size of pond, etc. We keep a record of applications, each being numbered in order received. Each applicant is notified at once, upon receipt of his application, of the number and date of entry of such application. Applications can be made at any time of the year. Notice is duly sent each applicant before fish are sent him, as to date and manner of shipment. We have about six hundred applications now on file, awaiting our annual distribution, which usually takes place in November. The number will no doubt aggregate fully as many as last season, as applications are still coming in freely, and many more will come after notice of distribution is published, which appears in one or more papers in each county annually. Of the success attending these distributions but little need be said. The fact that the lists show an increase for each successive year is proof enough, we think, not only of the wide-spread interest in carp raising, but of its practicability as well. In the appendix we give extracts from a few of the letters received from those engaged in raising carp.

WHITE FISH.

The United States Fish Commission have in the past expended large amounts yearly in planting the great lakes with this fish, of which it can be truly said there are but few better, and quite a noticeable increase in the young has been noticed at various points. Of this work Illinois has so far done but little, although it is a well known fact that a very large business is transacted in them within its borders. In fact the great distributing point for the lake fish is Chicago. The white fish is fast disappearing from Lake Michigan, and to such an extent is the decimation noticed as to call the attention of those interested from a business standpoint in the catch to the necessity of devising some means to check the drain and increase the supply. Various measures looking to a protective

law have been talked over, and an effort made on the part of some to inaugurate a movement that would induce the fishermen themselves to prepare the spawn as taken from the ripe fish when caught and dressed and deposit it in the lake, as one of the steps towards a means of propagation. Mr. A. Booth, one of the largest fish dealers in Chicago, if not in the world, said in an interview with one of the commissioners:

"I have been engaged in the fish trade here in Chicago for a great number of years, and I am sorry to say that the white fish and lake trout are getting scarcer each year. A few years ago a boat and crew could without trouble catch a boat load in a day. To-day a number of boats and crews with a tug could not get half the number. Something must be done to bring up the supply or we will soon be out of white fish here in Lake Michigan. I get my supplies from points at a great distance from Chicago, but what is true of Lake Michigan will soon be true of the other great lakes. I am of the opinion, however, that a means of production by artificial propagation can be devised that will accomplish the desired result better than any protective measures. We who are in the business are anxious for some means to be devised to increase the supply, and I for one would be glad to give the use of boats and men to promote any such interest."

As before stated, Illinois has so far done but little in the matter of stocking the lakes, much of the work having been done in the interest of the inland lakes and streams. During the month of April, 1886, the United States Fish Commission's car No. 3 was sent out to Chicago, at which place a meeting of the American Fisheries Society was held at that time. The car was used as a hatching station, having been fitted up for that purpose. About 3,000,000 white fish were hatched from eggs supplied from the Northville station. The fry so hatched was planted at various points in the lake within the borders of the State. We would recommend that a small hatching house for the purpose of hatching the white fish for Lake Michigan, and wall-eyed pike for the interior lakes and streams, be built and maintained at some convenient place—Chicago or Waukegan—and that a liberal amount of work be done in this direction. The eggs would be furnished by those interested in a commercial way, and the cost of such work and maintenance would be comparatively slight.

SHAD.

The United States Fish Commission sent Illinois one carload of shad, which were planted in the Fox, Rock and Illinois Rivers. What has been the result of such planting we cannot state. That it will be a success we doubt, as but little encouragement has so far been obtained from former plants made during previous years at various points in the State and at different northern points on the Mississippi River.

FISHWAYS.

In a former report the necessity of fishways, the laws regarding them, the opposition to their construction and the finding of the court in favor of the law, were fully considered. Acting upon the

opinion of the Supreme Court as given, we at once, by a circular letter, notified all owners of dams throughout the State that the law must be complied with. We append herewith a copy of the letter, which will in itself explain the causes which occasioned the delay in enforcing the law and the change in the plan of fishway, with our reasons for making the change:

ILLINOIS STATE FISH COMMISSION.
OFFICE OF S. P. BARTLETT, SECRETARY,
QUINCY, ILL., June 15, 1885.

DEAR SIR—The dam owned by you, we are informed, is unprovided with a fishway. The law makes it obligatory on your part to have a suitable one provided, and our duty to see that it is complied with.

In 1880 the Commission adopted the "Shaw" plan of fishway, which costs to put in properly from $300 to $800. In our efforts to enforce the law we met with opposition on the start, and were forced to institute legal proceedings. The case was decided in favor of the people, both before a justice and in the Circuit Court, and an appeal taken by defendant to the Supreme Court, when again the people were sustained and the validity of the law confirmed.

In order that the matter might be definitely settled, and to avoid making unnecessary expense to the owners of water-powers, should the law be declared unconstitutional, we suspended all proceedings until the case had been fully settled. During this time we have been investigating the merits of the various fishways, in order, if possible, to find the most practical and least expensive one in use, as much objection was raised by owners of small water-powers to the large expense entailed upon them if forced to use the "Shaw" fishway. A careful examination of the principal devices used throughout the Eastern States and Canada has convinced us that, considering the large amount demanded for the right to use them, together with the cost of construction, they would prove as expensive, and in a number of instances more so, than the "Shaw" fishway.

The nearest approach we have been able to find to a practical and economical fishway is the "Gile" fishway," which was adopted by us May 1, 1885. It is simple in its construction, can be put in by any efficient carpenter, will not cause a waste of power, and is very moderate as regards its cost, which, with plans, specifications and right to use, will range from $50 to $200, according to size of dam.

These are the facts. The Commissioners regard the free course of fish up and down all our streams as one of the great essentials to a successful repopulation of our streams, and that such has been the opinion of our lawmakers also is evidenced by the law making the building of fishways over all dams imperative. We trust you will see the importance of a prompt compliance with the law in this respect and put in a fishway without further notice.

We refer you to Vol. III, Illinois Report, page 581, Wm. Parker vs. The People of the State of Illinois, for opinion of Supreme Court on this matter. Please let us hear from you.

S. P. BARTLETT,
Secretary Illinois State Fish Commission.

Our success in enforcing the law has been, we are sorry to state, but limited, owners of dams seeming to think that because the law compelled them to build and maintain a good and sufficient fishway, and made the fish commissioners the judges of what constituted such an one, it was the duty of the Commission to furnish not only the model and instructions for building it, but that one of the board should locate it and personally superintend the building as well. To do this at all times has been an impossibility. There are a large number of dams in the State, and to visit each would require quite an outlay of both time and money. And while it is possible that the board, or some member of it, might give the time, yet perhaps none of them would feel that the other requisite could consistently be supplied by them for that purpose. The law gives each commissioner $100 per year for traveling and hotel expenses, and it can readily be seen that it would not allow much inspection of dams, or other work, after the necessary expenditures of the board had been met. Quite a number of dams have been visited and fishways located, but in the greater number of instances this has been impossible. Great dissatisfaction has existed among those living in the vicinity of such dams because of the failure of the commissioners to make such visits, and in the event of a failure to have fish-

ways put in, to commence proceedings to enforce the law. We have endeavored to do what we could by correspondence in the matter, but with unsatisfactory results. The fishway of the Dayton dam has been very unsatisfactory, and is so pronounced by those who have watched its operations, and complaints are not infrequent from those who are particularly interested in the fish interest of that stream.

The dams on the Kankakee river have been matters of controversy, the title to two of them having been in question. Now, by decision of court, the ownership we believe has been vested in the State. We have made an application to the Canal Commissioners to put in fishways over such dams as ordered by joint resolution of the 32d General Assembly, which we give herewith:

JOINT RESOLUTION 32D GENERAL ASSEMBLY.

Concerning the construction of fishways by the Canal Commissioners.

WHEREAS, it appears from statements made by the Fish Commissioners of the State of Illinois, that the dams constructed by the State of Illinois are not sufficient to meet the requirements of the present law in regard to fishways; therefore be it

Resolved by the House of Representatives, the Senate concurring herein. That the Canal Commissioners of the State of Illinois be, and are hereby instructed to complete or reconstruct said dams, so that they may afford easy and ample opportunity for fish to pass over said dams.

The following is the law relative to fishways:

Section third of an act to encourage the propagation and cultivation and to secure the protection of Fishes in all the waters of this State. -

Approved June 29, 1885.

"Sec. 3. That it shall be the duty of any person or persons who now or hereafter may erect any dam or other obstruction across any of the rivers, creeks, streams, bayous, or other watercourses within this State, to place therein suitable fishways, in order that the free passage of fish up or down through such waters may not be obstructed. A failure to perform this duty for thirty days after the passage of this act shall be deemed a violation of this section, and a failure to perform such duty for each fifteen days thereafter shall constitute a separate offense."

"Sec. 6. Any person or persons violating any of the preceding sections of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than ten nor more than two hundred dollars and costs of suit."

A number of dams have been provided with fishways, and quite a number of owners have expressed a willingness to comply with the law; and we hope to be able to induce all to see the importance of doing so.

We have adopted the most simple and effective one we could procure; and, while we do not think it so effective as some others, yet we did not feel justified in adopting one which, from its cost, would make it burdensome to a large majority of those owning water-powers throughout the State, our object being to procure the most effective for the least expense.

In the appendix will be found a statement from citizens of the county regarding the fishway over the dam at Dayton.

FISH LAWS.

One of the most important features of the fish interest, as relates to an increase of fish as a food supply, is the necessity for laws sufficient to protect them from wholesale destruction. For years the product of the waters was considered common property, to be taken when, where and in any manner desired. Fish were plenty, and the limited demand seemed to render protective laws unnecessary. But as the country filled up the demand, as a consequence, increased, and to meet this demand every device which human ingenuity could produce was used to catch them. And as a result each year showed a diminution in the supply, until with hook and line it was next to impossible to make a good catch in waters where, only a few years previous, they were plentiful. Then it was sought by legislation to remedy the evil, and an act making a close season for game fish was passed. This met with a decided opposition from various parts of the State. The good results, however, began to be apparent, and since, from time to time, the laws have been amended, or new ones enacted, until now we have the seine prohibited for six months in the year, and no seine to be used the mesh of which is less than two inches square. And yet there remains much to be done before the object to be attained, viz: the protection and increase of fish, is accomplished. To make laws which will apply equally to all portions of the State is a difficult matter. Owing to the great length of the State, the difference in seasons of its extreme portions must be considered, as well as the variety of its waters. These considerations render it extremely difficult to make laws which will prove satisfactory to all sections, unless the use of the seine or net be prohibited entirely, at least for a period of years. As the law now stands, it is very difficult to obtain a conviction, as few are caught in the act of taking fish, the work being mostly done at night, and if the fish so obtained are openly offered for sale the next morning it is no proof of a violation of the law. In truth, it is a notorious fact in many sections of the State that the law is, and has been, almost entirely disregarded. The fishermen ply their avocation for the entire season, when the stage of water will admit of it. This because the interest was a large one, and the people of such vicinities, either from sympathy with the fishermen or out of fear, declined to enter complaint or become witnesses in prosecuting them. We have had an immense amount of correspondence on the subject from the various sections of the State, and have been severely criticised not only by the residents, but by the press of such vicinities.

The people do not seem to understand that there is nowhere in the law any special authority given the Fish Commission more than is delegated to any citizen, to enforce the law. Practically it would, from the nature of the work and duties of the Commissioners, be impossible to give the enforcement of the laws that personal attention it requires; and would, of course, necessitate the expenditure of a great deal of money if the work was done by the employment of parties for that purpose. And as neither the authority nor the means of prosecuting that portion of the work has been at the disposal of the board, they have accomplished, personally, but little

more than could be done by endeavoring to awaken an interest among the fish clubs of the State, and we are pleased to note a number of convictions through the efforts of such clubs. The C. B. & Q. Rod and Gun Club have, through their efforts, made it extremely unpleasant for those violating the laws along the C. B. & Q. R. R. from Aurora to Chicago, as will be seen by the letter submitted herewith:

NAPERVILLE, ILL., May 1, 1886.

HON. S. P. BARTLETT. *Secretary Fish Commission, Quincy, Ill.:*

DEAR SIR—The following shows we are yet alive: "A number of dip-net fishermen settled their bills with Justice Dille the other day, and have come to the conclusion that fish caught that way come too high for profit. There were so many reports of fish being caught with nets that the C. B. & Q. Rod and Gun Club delegated one of their number to prosecute anybody and everybody engaged in violating the law." This cost them $12.50 per head; it came high. Please send me a few copies of the new law.

Yours respectfully,
WILLIAM P. WRIGHT.

At Quincy Mr. J. C. Pipino, who was appointed game warden under an act passed at the last session of the General Assembly, has given a great deal of attention to the violations of the fish laws, and has procured a number of convictions, the effect of which has been that, with few exceptions, the law relating to the use of the seine, in that vicinity, has been generally observed.

The principal difficulty in enforcing the laws has been encountered along the greater rivers of the State, and the lakes and sloughs adjacent and tributary to them. The smaller and interior streams have been better protected by a more general enforcement of the laws, and, in our opinion, it is that portion of the State removed from the greater rivers which needs the greatest protection, as their means of replenishing depleted streams must depend largely upon the efforts of the Fish Commission; and, while the drain upon these larger rivers is immense, still the opportunities for replenishment are more favorable than for the smaller inland waters, they having direct communication with that great source of fish supply, the Mississippi River, and for the most part practically without obstruction by dams. While, in reviewing the work of enforcing the protective laws, we find much left to be accomplished before results can be called satisfactory, still we think, taking the whole State over, that much more has been accomplished in that direction during this season than any previous one. The people seem to be gradually awakening to the fact that an indiscriminate use of seine and net is and has been having a disastrous effect upon the natural supply of the waters, and that the law was not put upon the books as an ornament simply, but to be used for a good purpose, namely, to protect an important food-producing supply. The time has passed in this country when the product of our waters can be considered the property of any one for the taking at any time. The Supreme Court has said that fish are the property of the sovereign, or the people, and that as such their representatives have a right to say how they shall be taken. Other States have made effective and successful prohibitory laws so far as the use of the seine, net and spear are concerned, and the results in an increased supply have convinced even the fishermen themselves of the value of such legislation. We know that it is urged by some that propagation is better than protection, and while this may be true of the great

lakes, it is not of the little inland lakes, streams and sloughs, where, with one sweep of the seine, everything in the nature of fish can be taken out. That the principle of restocking is correct and can be demonstrated we know, but it is quite as essential that the work done be protected until time enough has elapsed to give the fish so planted an opportunity, by their great reproductive qualities, to multiply and replenish the waters. This seems to us to be a fact so patent to any reasoning mind as to be unnecessary to state it, yet experience has shown us that it does not, even yet, make itself felt by all; but we trust that time and the beneficial effects of such work as has been done in this direction may eventually educate all up to a full appreciation of the necessities of the case. Herewith we give a copy of the law as amended at the last session of the General Assembly.

FISH LAWS OF THE STATE OF ILLINOIS.

[Approved June 30, 1885, in force July 1, 1885.]

SECTION 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly*, That it shall be unlawful for any person to catch or kill any fish with any seine or any other device used as a seine, in or upon any of the rivers, creeks, streams, ponds, lakes, sloughs, bayous, or other watercourses, wholly within or running through the State of Illinois, nor shall the meshes of any such net, weir basket or trap, or any device used for catching fish in such waters not above prohibited, except for catching minnows for bait, be less than two inches square.

Provided, however, That seining shall be allowed between the first day of September and the first day of March of the following year, with seins whose meshes shall not be less than two inches square.

§ 2. That no person shall place, cause to be placed or erected, any sein, net, weir fish dam, or other obstruction in or across any of the rivers, creeks, streams, ponds, lakes, sloughs, bayous, or other watercourses wholly within this State, or in any part of such stream or watercourse wholly within this State, in such manner as shall obstruct the free passage of fish up or down or through such watercourses, and that it shall be unlawful for any person to catch or take fish, except minnows for bait, with any device other than a hook and line or spear, within one-half mile of any dam constructed across any of the rivers or creeks of this State.

§ 3. That it shall be the duty of any person or persons who now own or hereafter may erect any dam or other obstruction across any of the rivers, creeks, streams, bayous, or other watercourses within this State, to place therein suitable fishways in order that the free passage of fish up and down through such waters may not be obstructed. A failure to perform this duty for thirty days after the passage of this act shall be deemed a violation of this section, and a failure to perform such duty for each 15 days thereafter, shall constitute a separate offense.

§ 4. That it shall be unlawful for any person or persons at any time to catch or kill any fish in any of the rivers, creeks, ponds,

lakes, sloughs, bayous, or other watercourses within the jurisdiction of this State by the use of lime, acid, medicinal or chemical compound or explosive.

§ 5. It shall be unlawful for any person or persons to take by any device, or means whatsoever brook trout from any of the streams, lakes, or other watercourses within this State, between the fifteenth day of July and the first day of April following, in each year, and at no time with any device whatever except a hook and line.

§ 6. Any person or persons violating any of the provisions of the preceding sections of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than ten nor more than two hundred dollars ($200) and costs of suit.

§ 7. Any person or persons shall for the purpose of fishing, without the consent of the owner, trespass upon the land of another, containing any fish pond or lake, whether natural or artificial, when and where the waters of such pond or lake are not directly connected with any of the watercourses of this State, shall be deemed guilty of a misdemeanor, and on conviction shall be fined in any sum not less than ten nor more than one hundred dollars, and costs of suit, for the first offense, and not less than thirty nor more than two hundred dollars for the second offense, and the same for each subsequent offense as for the second offense.

§ 8. To enforce the provisions of this act all suits brought under the same shall be in the name of the people of the State of Illinois, and shall be brought on the complaint of any person or persons, showing by affidavit that some section of this act has been violated, giving the names of the person or persons violating, if known; if not known, such affidavit shall state by some person or persons whose name or names are unknown, and such complaint shall be made before any justice of the peace of the county in which such violation has been made.

§ 9. Where such violation is alleged to have been committed upon that portion of a stream or watercourse which may be the dividing line between two counties, then the complaint may be made to any justice of the peace of either of such counties.

§ 10. If the justice before whom such complaint shall be made shall be satisfied that there is reasonable cause to justify the making of such complaint, he shall issue his warrant directed to the sheriff or constable of such county, commanding him forthwith to arrest and bring before him, or in his absence, before some other justice of the peace within such county, the person or persons alleged to have been guilty of violating any of the sections of this act.

§ 11. Whenever any person or persons shall be brought before any justice of the peace in the manner provided for in this act it shall be the duty of such justice to hear and determine the complaint. The person or persons so charged may demand a jury at any time before the commencement of the trial, and the case shall be tried as in cases before justices in civil cases, and judgment shall be for acquittal or conviction of the defendant or defendants in the case. In case a jury is called, the form of the verdict shall be, if for conviction, "we, the jury, find the defendant guilty and

assess the fine at ——— dollars;" and if for acquittal, "we, the jury, find the defendant not guilty." The justice shall pronounce judgment in accordance with the verdict.

§ 12. Whenever any judgment of conviction shall be rendered against any defendant or defendants as above provided, execution shall issue forthwith on such judgment, and the sheriff or constable to whom the same shall be directed, shall pay one half of all penalties collected on such execution in payment of such judgment to the person or persons who shall have made the complaint, and the remaining one-half to the superintendent of schools of the county wherein such trial shall be had.

§ 13. Whenever any execution issued as above provided shall be returned "no property found," the justice issuing the same, or, in case of his death or absence, any other justice having possession of the docket in which such judgment was entered, shall issue his warrant to the sheriff or any constable of such county, commanding him to take and deliver the defendant or defendants in the execution to the jailor of such county, who shall receive such defendant or defendants into his custody and commit him or them to the common jail of such county or workhouse of such county whenever one exists, for a period of not less than ten or more than sixty days as the justice shall decide and direct in his warrant, but such defendant or defendants so arrested or committed shall be discharged at any time on payment of such fine and costs.

§ 14. Any defendant or defendants against whom such judgment of conviction shall be rendered, and in case of acquittal the party making the complaint, or any person who will give the necessary bond, shall have the right of appeal on the same terms as in civil cases before justices, but no proceedings herein provided for shall be stayed until such appeal shall be fully perfected.

§ 15. It shall be the duty of all sheriffs, deputy sheriffs and constables of this State to look after the violations of any of the sections of this act, to make complaints where such violations come to their knowledge, and they shall have power to arrest any person or persons they may find in the act of violating any of the provisions of this act without a warrant, and keep him or them in custody until complaint can be made and proceedings had against him or them as hereinbefore provided.

§ 16. That an act entitled "An act to prevent the destruction of fish in the State of Illinois, and to secure the unobstructed passage of fish in all the waters of this State, wherein they were once accustomed to be found," approved March 22, 1872; an act entitled "An act to secure the free passage of fish in all the waters of the State," approved March 25, 1874; an act entitled "An act to encourage the cultivation of fishes within the State of Illinois," approved and in force May 13, 1879; and an act entitled "An act to protect brook trout," approved May 29, 1879, are hereby repealed, but such repeal shall not disturb the status of the present board of fish commissioners.

While the foregoing law is a decided advancement upon any previous one, we think that to any one who has given the matter any thought, or from personal observation has seen its workings, no

argument is needed to convince him of the necessity for much more stringent laws. We believe that the use of the seine should not be restricted simply to certain portions of the year, but that it should be prohibited entirely, at least for a number of years. And so completely should it be abolished as to make even the possession of such seine unlawful. The existing law does not admit of sufficient scope in determining what shall be considered evidence of a violation. As it is difficult to catch them in the act, it would seem that the possession of fish in large quantities should be considered at least questionable enough to make it necessary for the possessor to prove the manner of their taking.

The argument used before the committee last session was to the effect that an abolition of the seine meant a complete paralysis of a large and important business; that a large amount of money was invested and a large number of men employed in this industry, and to abolish the use of the seine meant ruin to many. We know that to some extent this is true. Yet, as in all great questions of political economy, the benefit to the majority may be the detriment of the few, and the number who actually depend for a subsistence upon this business is but very small in comparison with those who suffer either directly or indirectly from the effect of the work. We do not believe that the State can afford to lose the benefit of millions of pounds of good, cheap food simply that a few may be enabled to continue, for a while longer, their present mode of business. For, after all, that is what it amounts to in the end. This business could, in the nature of things, exist but a comparatively short time, at best, as it now is. For any reasonable person can readily foresee the natural results of the present wholesale destruction. It means ultimate extinction.

We sincerely hope that the matter will be thoroughly canvassed before the Fish and Game Committee next session, and opportunity afforded to those financially interested to show, by such statistics as they may be able to procure, in what way the people are made the gainers by the continuance of present methods. Millions of pounds of buffalo and other "rough" fish, with a proportionate amount of the finer varieties, are taken from our waters annually, and the statistics show that two-thirds of this amount finds its way *out of the State* to foreign markets.

We give herewith a clipping from a daily paper, which will give an idea not only of the methods used and the character of the catches, but also what the public think of it:

WHOLESALE FISH SLAUGHTER.

Saturday afternoon Johns Bros., the fishermen, captured 12,000 pounds of fish in Goose lake, five miles south of this city.—*Pekin Times.*

Brother Bartlett, here is a case that deserves your attention. Goose lake is a beautiful body of spring water about one mile long by one-third of a mile wide. It outlets into the Illinois river through a deep and swift running stream called Gig Slough. It is a great resort for anglers, and hundreds of pounds of game fish are caught there with hook and line.

The *modus operandi* of these professional fish killers is to blockade the outlet with a seine, and then with another seine long enough to reach clear across the lake drag it from end to end, thus scooping every fish in the lake that is not small enough to slip through the meshes of the seine.

The same thing is done in many of the fine fishing grounds in that region, and the result is that the game fish are rapidly thinning out. If our game fish were that way protected there would be no finer fishing grounds in the country than those along the Illinois. If these wholesale slaughterers are allowed to have their way for a few years longer, however, it will be good-bye game fish in Illinois.

And yet, even with so large a number of fish in possession, beyond any doubt taken in an illegal manner, these parties can openly dispose of them without fear of penalty, possession being, as we have before stated, no proof of violation of the law. This is only one of many instances which have come under our notice.

The use of the spear, as permitted by our law, was undoubtedly an oversight. It should be prohibited under severe penalties. At Fox Lake, and, in fact, a number of places, an incredibly large number of large and fine fish are taken through the ice annually by its use. It is not only destructive, but to our mind its use is nothing less than a relic of barbarism. Mr. Lippincott, editor of the "Fox Lake Muskellonge," writes us that the number of bass, pickerel, etc., taken through the ice from Fox Lake with spears is immense, aggregating thousands of pounds of fish daily. When the fact is considered that the fish so taken are on their producing grounds, and at a time nearly approaching their spawning season, and from one of the finest natural breeding grounds of the State, some idea may be formed of the extent of the destruction. Again, we think the penalties for violation of the law should be made greater. It is almost impossible, even where ample proofs of violation are obtained—for there are sections where the violations are open and flagrant—to get a fine assessed for more than the lowest amount specified. This, of course, has no deterrent effect upon the fishermen, who can well afford to pay a fine of $5 and costs for the privilege of making such catches as the one just mentioned. In fact, in some localities they can afford to pay a fine for each trip, and still be largely the gainers by the transaction. We hope that a careful consideration will be had, not only of the needs of the people, but of those interested in fishing as a business as well, before action is taken in the matter, and that the laws will be so amended as to give to all that protection and proportionate benefit to which they are equitably entitled.

SUMMARY.

Of the practical success of the work in the past we can only take such evidence as we have gathered, and our own observations, and draw such conclusions as they seem to warrant. It has been demonstrated to our satisfaction that the work is second to none in value to the people of the State in its possibilities, needing only the means and the opportunities for developing them. In a country so rapidly filling up as this—in our State already so well peopled—cheap food is a desideratum. This can be met to no inconsiderable extent, under proper conditions and protection, by the utilization of the waste places of farm and valley in the construction of ponds for the cultivation of fish, and by the improvement and protection of the various waters of the State. We have, in the main, had very successful seasons for our work, and our distributions of native fish have been satisfactory, but such seasons as the last, the phenomenally hot weather and the long-continued drought, prove to us the necessity for possessing better facilities for our work than those now in use. In fact, the value of our work in any season could be largely increased if the service could be properly equipped. We need an aquarium car, such as is used in many of the State

Commissions, and altogether by the U. S. Commission. By its use we could transport larger quantities of fish longer distances and with a smaller percentage of loss. As it now is, we are dependent on the baggage cars of the passenger trains, and find them too often crowded with their own work, which we cannot expect them to neglect for ours. The State of Missouri has built for its Commission a car that meets the requirements, and has proven admirable for such use, they having adopted the methods used by us in taking and distributing the young native fish. Our office and storage accommodations have become inadequate to our needs. Some years ago we built a small cabin boat for our office and the storage of our appliances, boats, etc. But this, besides being too small for our increased work, is now worn out, and we need a new and larger office boat. Our records and accumulation of books and documents, in their way valuable, require better protection, and a safe is much needed in the office for their deposit. Our appliances rapidly wear out, and we shall have to replenish largely another season. The office work has become in itself quite a large undertaking, as the great number of letters now on file will amply prove. The letters for the months of November and December of last year aggregated about four thousand. This was occasioned largely by the demands of the carp distribution.

During the year we arranged with the Fair Association at Centralia for the use of a portion of their grounds for a carp pond, where, under the supervision of Major Breuning, of our board, we expect to propagate carp for distribution throughout that portion of the State. We have built a small pond and stocked it with large carp, and hope to be able to report favorable results from that source. We expect to improve and enlarge the pond as necessities seem to require, and to add to the number from time to time, believing as we do that there is enough merit in the carp to warrant additional effort to propagate a supply sufficient to stock all of our streams and lakes with them. In relation to amendments in the existing laws, we would say that we think the law regarding fishways should be so amended as to increase the penalties for violation, and to provide that it be made a part of the duties of the various State's Attorneys to prosecute cases of neglect or failure to comply with the law in their counties. We think that the Commission should be allowed at least sufficient limit in the expenditure of the appropriation to provide for reimbursement of all absolute expenditure of any commissioner while engaged in such duties relating to the enforcement of the law as may be found necessary—in fact, while engaged in any of the necessary work of the Commission.

The fish law should be so amended as to give the needed protection and simplify the making of proof of violation of the law, so that those whose duty it may be to enforce it may have a reasonable prospect of obtaining conviction. There should be some person or persons appointed to whom should be delegated authority to look after enforcement of the existing laws, and funds be provided to compensate them for such work. These are the most urgent needs. We beg leave to submit them, and trust that so far as in the judgment of our representatives they are not at variance with

the interests of the State they may be favorably considered, and that the necessity for an increased appropriation to meet the demands of the largely increased work may be felt and appreciated.

ACKNOWLEDGMENTS.

We desire to acknowledge our obligations to the United States Fish Commission for the very liberal and courteous treatment received at the hands of the Commissioner of Fisheries, Professor Spencer F. Baird, and his assistant, Major Ferguson, and Colonel M. McDonald, Chief of Division of Distribution.

They have liberally supplied us with young carp, giving us the use of the car for their transportation, both for those intended for individual distribution and those intended for public waters. They have shown at all times an appreciation of the wants of our State and aided us to meet them.

We cannot speak too highly of the value of that part of the economy of our government, and the benefit resulting from their work cannot properly be estimated. Thousands of ponds, millions of pounds of food, easily produced from places heretofore considered worthless, are the outgrowth of the investigations and experiments organized and carried out to a successful completion by Prof. Baird and his assistants, and Illinois has shared largely, among other States, the benefit accruing from such work. Prof. S. A. Forbes has, as will be seen, furnished us the material for one of the most satisfactory portions of our report—the list of fishes native to the State, properly classified and arranged, and the papers treating of their food. From a scientific standpoint it is of great value, and we take pride in referring to it. Prof. Forbes has placed the Commission under obligations for repeated courtesies, and has at all times shown a willingness to aid us in any way possible.

The railroads have, as is usual with them, treated us with great liberality, and we are very sure that without their aid our work must have been greatly curtailed. Our requests have been frequent, but, with few exceptions, have been promptly granted. We desire to make special mention of the following roads:

Chicago, Burlington and Quincy Railroad Co.
Chicago and Alton Railroad Co.
Wabash, St. Louis and Pacific Railroad Co.
Illinois Central Railroad Co.
Chicago, Rock Island and Pacific Railroad Co.
Chicago and Northwestern Railroad Co.
Chicago, Milwaukee and St. Paul Railroad Co.
Louisville, New Albany and Chicago Railroad Co.
Chicago and Eastern Illinois Railroad Co.
Toledo, Peoria and Western Railroad Co.
Louisville, Evansville and St. Louis Railroad Co.
Peoria, Decatur and Evansville Railroad Co.
Louisville and Nashville Railroad Co.
Jacksonville Southeastern Railway Co.
Chicago and St. Louis Railroad Co.
Cairo, Vincennes and Chicago Line.

Illinois and St. Louis Railroad Co.
Indiana, Illinois and Iowa Railroad Co.
Indianapolis and St. Louis Railroad Co.
Fulton County Narrow Gauge Railway Co.
Illinois Midland Railway Co.
Toledo, Cincinnati and St. Louis Railroad Co.

The fish interest has had no better friends than those of the press throughout the State, and to their aid we owe very much of the rapid advancement made in our work. They have always responded liberally to all requests for space, and have done their full share in bringing the necessities of fish culture and protection to the notice of the public.

APPENDIX.

In connection with this report we submit an appendix in which we give the list of carp distributed, location of ponds, etc., extracts from letters relating to the culture of carp, and increase of native fish; a list of rivers supplied with native fish; a list of the Fish Commissioners of the United States, the several States and Canada. Also the papers by Prof. Forbes: a list of the native fish of Illinois, classified and arranged; a paper on the food of the young native fish, and one on the food of the young whitefish.

All of which we respectfully submit.

N. K. Fairbank,
S. P. Bartlett,
Geo. Breuning.

APPENDIX

TO THE REPORT OF THE BOARD OF FISH COMMISSIONERS OF THE STATE OF ILLINOIS.

CARP DISTRIBUTION BY UNITED STATES FISH COMMISSION,

Through Illinois State Fish Commission, for Illinois Applicants, 1885–6.

NAME.	Post Office.	Express Office.	County.	No.	Date ship'nt.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
P. L. Johnson	Mt. Vernon	Mt. Vernon	Jefferson	20	Nov. 27				
Julius Broshl	Pana	Pana	Christian	20	"	2½ acre	8 ft.		
Louis Wegman	Richton	Richton	Cook	20	"	3¼ "	4 "		
Isaac Detheridge	Fame, Ks.	Fame, Ks.	Greenwood	20	"				
J. M. Bouress	Hidalgo	Hidalgo	Jasper	20	"				
Jas. Cardot	Newton	Newton	"	20	"				
A. Thayer	Woodhull	Woodhull	Henry	20	"	1 acre	4 ft.		
B. F. Combs	Olney	Olney	Richland	20	"				
Rufus Brown	Woodstock	Woodstock	McHenry	20	"				
A. R. Glenn	Jacksonville	Jacksonville	Morgan	20	"	¼ acre	3 ft.		
Garin Bros	Princeton	Princeton	Bureau	20	"	¼ "	4 "		
S. B. Bowman	Hunt City	Hunt City	Jasper	20	"				
E. Hensinger	Burnt Prairie	Burnt Prairie	White	20	"				
E. D. Gwinn	Loraine	Loraine	Hancock	20	"				
A. M. Ryder	Abingdon	Abingdon	Knox	20	"				
J. P. Middlecott	Paxton	Paxton	Ford	20	"	1 acre	4 ft.		
Theo. Dickrotger	Carlyle	Carlyle	Clinton	20	"				
Wm. Werre	Steeleville	Steeleville	Randolph	20	"				
Thos. Leggett	Massac Creek	Massac Creek	Massac	20	"				
Jno. Norton	Cissna Park	Cissna Park	Iroquois	20	"				
Jno. A. Miller	Salisbury	Salisbury	Sangamon	20	"				
W. A. Bothwell	Kiswaukee	Kiswaukee	Winnebago	20	"				
Geo. D. Shaffer	Shelbyville	Shelbyville	Shelby	20	"				
Jno. Lutz	Marston	Marston	Alida	20	Dec. 11	1½ acre	5 ft.		
E. Lintz	"	"	"	20	"	1½ "	5 "		
Lizzie Lintz	"	"	"	20	"	1½ "	5 "		
J. J. Davis	Macon	Macon		20	"				
E. L. Hinkley	Belleville	Belleville	St. Clair	20	Dec. 12	⅛ acre	½ ft.		
Carl Rupke	Sigel	Sigel	Shelby	20	"				
P. S. Mahoney	Wheeler	Wheeler	Jasper	20	"				
Ira Coe	Quincy	Quincy	Adams	20	"				
V. Heinzman	New Baden	New Baden	Clinton	20	"	1/5 acre	5½ ft.		
Wm. Guesbaum	"	"	"	20	"				
Martin Mayer	Pinecknevville	Pinecknevville	Perry	20	"				
J. H. Theis & Son	Steeleville	Steeleville	Randolph	20	"	¼ acre	5 ft.		
Wm. Foster	Sparta	Sparta	"	20	"	2 "	4 "		
L. D. Foltz	Montrose	Montrose	Effingham	20	Dec. 15	1/16 "	4 "		
H. E. Wiley	Tamaroa	Tamaroa	Perry	20	"				
E. Wiley	"	"	"	20	"				

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ment.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
J. D. Lee	Tamaroa	Tamaroa	Perry	20	Dec. 15				
Wm. Lee	"	"	"	20	"				
J. Moulton	"	"	"	20	"				
J. Smith	"	"	"	20	"				
Carl Repke	Sigel	Sigel	Shelby	20	"				
H. H. King	Augusta	Augusta	Hancock	20	"				
H. G. McKeby	Nashville	Nashville	Washington	20	Nov. 21				
Frank Thomas	Virden	Virden	Macoupin	20	"	3 acres	7 ft.		
John. M. Egli	Quincy	Quincy	Adams	20	"	1 "	4 "		
George B. McNamee	Buckingham	Buckingham	Kankakee	20	"	½ "	3 "		
F. M. Taggart	Wayland	Wayland	McDonough	20	" 26	¼ "	4 "		
J. D. Miniger	Macomb	Macomb	"	20	"	¼ "	4 "		
S. T. Gibson	New Windsor	New Windsor	Mercer	20	"	1 "	3½ "		
F. Baumann	Bunker Hill	Bunker Hill	Macoupin	20	"	¼ "	7 "		
Aug. Stodt	"	"	"	20	"	¼ "	7 "		
Wm. Sharp	Pittsfield	Pittsfield	Pike	20	"				
A. W. Griffith	Grand Ridge	Grand Ridge	LaSalle	20	"	¼ acre	1 ft.		
James H. Smith	Moro	Moro	Madison	20	"	¼ "	2½ "		
J. T. King	Upper Alton	Upper Alton	"	20	"				
D. S. Groff	Claremont	Claremont	Richland	20	"				
J. M. Pearson	Godfrey	Godfrey	Madison	20	"				
James Stronse	Long Prairie	Long Prairie	Wayne	20	"				
W. J. Peters	Carlyle	Carlyle	Clinton	20	"				
Marion Tyffer	Long Prairie	Long Prairie	Wayne	20	"				
S. W. Colton	Princeton	Princeton	Bureau	20	"	½ acre	3 ft.		
W. Bengert	Quincy	Quincy	Adams	20	"	¼ "	3½ "		
John Bengert	Melrose	Melrose	"	20	" 1	"	1½ "		
J. F. Richards	Adams	Adams	"	20	" 27	¼ "	1 "		
G. W. Enoch	Princeton	Princeton	Bureau	20	"	¼ "	3 "		
Ira Coe	Melrose	Melrose	Adams	20	" 1	"	4 "		
George Booth	Adams	Adams	"	20	"	¼ "	3 "		
J. F. Hughes	"	"	"	20	" 1	"	1½ "		
Thomas Brown	Parkersburg	Parkersburg	Richland	20	" 1	"			
L. B. Barton	Raleigh	Raleigh	Saline	20	"				
A. S. Williams	Danville	Danville	Vermilion	20	"	½ acre	5 ft.		
D. M. Snyder	Abingdon	Abingdon	Knox	20	"				
T. W. Hall	Gallatia	Gallatia	Saline	20	"				
Harrison Cook	Marshall	Marshall	Clark	20	"	¼ acre	2½ ft.		
Benj. Weaver	Danville	Danville	Vermilion	20	"				
Wm. L. Ayer	Centralia	Centralia	Jefferson	20	"				
J. H. Paulin	Atlanta	Atlanta	Logan	20	"	¼ acre	4 ft.		
A. W. Ladd	Dayton	Dayton	LaSalle	20	"				

Wm. Kibbe	Dayton	Dayton	LaSalle	20	Nov.	27	½	acre	7	ft.	
Louis King	New Douglas	New Douglas	Madison	20	"						
Fred Obst	Belleville	Belleville	St. Clair	20	"						
A. Hatch	Strout	Strout	Pike	20	"		½	acre	6	ft.	
Wm. Wilson	Utica	Utica	LaSalle	20	"		2	"	3	"	
Henry Martin	Brighton	Brighton	Macoupin	20	"	24	1	"	1	"	
Henry Turner	Atlanta	Atlanta	Logan	20	"						
Clyde Turner	"	"	"	20	"						
James Paxton	Kansas	Kansas	Edgar	20	"		1	acre.	4	ft	
Oswald Jessup	West Liberty	West Liberty	Jasper	20	"		¾	acre.	3	ft	
S. C. Fox	Garden Prairie	Garden Prairie	Boone	20	"		1.5	"	2	"	
R. H. Markham	Loudon Mills	Loudon Mills	Fulton	20	"						
Wm. Muir	Steeleville	Steeleville	Randolph	20	"						
F. Lohr	"	"	"	20	"						
Aug. Adair	"	"	"	20	"						
Grigg West	Ashley	Ashley	Washington	20	"						
E. P. Ashbrook	Windsor	Windsor	Shelby	20	"		⅛	acre.	5	ft.	
Wm. Niemeyer	Mt. Olive	Mt. Olive	Macoupin	20	"		¼	"	8	"	
N. Lenz	Aledo	Aledo	Rock Island	20	"		1½	"	8	"	
N. Troutner	Grant Fork	Grant Fork	Madison	20	"						
Christian Tontz	Saline	Saline	"	20	"		⅛	acre	4	ft.	
C. Peck	Marshall	Marshall	Clark	20	"		⅓	"	5	"	
U. J. Pifer	Sullivan	Sullivan	"	20	"						
John Dysart	Dixon	Dixon	Lee	20	"		1	acre.	3	ft.	
John Clair	Mendon	Mendon	Adams	20	"		¼	"	5	"	
George Bruening	Centralia	Centralia	Marion	200	"						
W. D. Finlay	Quincy	Quincy	Adams	20	"		1	acre.	4	ft.	
F. Finlay	"	"	"	20	"		½	"	3½	"	
J. J. Meyrida	Pawnee	Pawnee	Sangamon	20	"						
Douty Patterson	Sullivan	Sullivan	Moultrie	20	"						
Charles Stone	Aurora	Aurora	Kane	20	"						
Geo. P. Roscwell	Bunker Hill	Bunker Hill	Macoupin	20	"	25					
Stewart & Walcott	Chicago	Chicago	Cook	20	"	24					
C. H. Atkins	Arlington	Arlington	Bureau	20	"						
Benj. Cummings	Camp Point	Camp Point	Adams	20	"		1	acre.	15	ft	
D. H. Patton	Baylis	Baylis	Pike	20	"						
G. W. Shay	Dennison	Dennison	Clark	20	"		1	acre.	6	ft.	
John Harton	Mendota	Mendota	La Salle	20	"						
A. Fisher	West Salem	West Salem	Edwards	20	"		1/10	acre.	3½	ft.	
D. Garber	Flora	Flora	Clay	20	"		¼	"	3	"	
S. H. Jemeson	Farmingdale	Farmingdale	Sangamon	20	"		⅓	"	3	"	
Harry Hare	Ottawa	Ottawa	La Salle	20	"		¾	"	10	"	
James Barnes	Dayton	Dayton	"	20	"						
Roland Gilpanes	"	"	"	20	"		¼	acre	8	ft.	
S. R. Snyder	Benson	Benson	Woodford	20	"		½	"	3½	"	
C. E. Hodgdon	Quincy	Quincy	Adams	20	"		1	"	4	"	
Thomas Brew	Pittsfield	Pittsfield	Pike	20	"						
Thos. Longhorn	Albion	Albion	Edwards	20	"		½	acre.	4½	ft.	
T. L. Moss	Mt. Vernon	Mt. Vernon	Jefferson	20	"		½	"	3	"	
Douty Patterson	Sullivan	Sullivan	Moultrie	20	"		½	"	5	"	
Thos. Whitson	Woodstock	Woodstock	McHenry	20	"						
Levi Watson	Westfield	Westfield	Clark	20	"						

Name.	Post Office.	Express Office.	Counties.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
James Waugler	Opdyke	Opdyke	Jefferson	20	Nov. 24				
J. J. Wright	Chapman	Chapman	Montgomery	20	"	½ acre	4 ft.		
A. U. Walker	Newton	Newton	Jasper	20	"				
Hon. Nathan Williams	Sterling	Sterling	Whiteside	20	" 21				
A. L. Wilburs	Dongola	Dongola	Union	20	"				
H. W. Mager	Good Hope	Good Hope	McDonough	20	"				
Isaac Woodyard	Ridge Farm	Ridge Farm	Vermilion	20	"				
Geo. P. Willey & Son	DuQuoin	DuQuoin	Perry	20	" 24	⅛ acre	4 ft.		
Samuel White	Flora	Flora	Clay	20	"	¼ "	6 "		
Ira Coe	Quincy	Quincy	Adams	20	" 20				
J. F. Hughes	"	"	"	20	"				
Geo. Booth				20	"				
A. S. Williams	Danville	Danville	Vermilion	20	" 21	⅛ acre	5 ft.		
Louis Pregler	Chicago	Chicago	Cook	100	"				
Wm. Rhode	Claremont	Claremont	Richland	20	" 24	1 acre	5 ft.		
N. Loser	"	"	"	20	"	1 "	5 "		
Geo. Lutz				20	"	1 "	5 "		
R. A. Hunt	Olney	Olney	"	20	"	1 "	3 "		
Wm. Hannan	"	"	"	20	"	1 "	3 "		
D. Baird				20	"	1 "	3 "		
M. C. Erehm	Claremont	Claremont	"	20	"	1 "	5 "		
E. Bowyer	Noble	Noble	"	20	"	⅕ "	6 "		
David Boatman	Olney	Olney	"	20	"				
J. W. Findlen	Noble	Noble	"	20	"	¼ acre	2 ft.		
Jacob Gloss	Olney	Olney	"	20	"				
Joseph Gloss	"	"	"	20	"				
H. Swallen	Claremont	Claremont	"	20	"	1 acre	5 ft.		
F. Schmachel	"	"	"	20	"	1 "	5 "		
W. J. Burgess	DuQuoin	DuQuoin	Perry	20	"	1 "			
S. D. Kemp	Elmwood	Elmwood	Peoria	20	"	2½ acres	3 ft.		
D. E. Kemp	"	"	"	20	"	2½ "	3 "		
A. F. Rogers	Upper Alton	Upper Alton	Madison	20	"	½ acre	5 "		
George Waters	Milan	Milan	Rock Island	20	"	5 acres	5 "		
Wm. G. Wilkins	Adair	Adair	McDonough	20	"				
G. N. Wyatt	Mt. Erie	Mt. Erie	Wayne	20	"	⅞ acre	6 ft.		
A. S. Williams	Danville	Danville	Vermilion	20	"				
J. H. Ledlie	Pittsfield	Pittsfield	Pike	20	"	½ acre	5 ft.		
B. F. Bair	Galesburg	Galesburg	Knox	20	"	½ "	4 "		
N. Baldwin	Stewartson	Stewartson	Shelby	20	"				
Thos Childers	Pinkstaff	Pinkstaff	Lawrence	20	"				
Henry Bender	Carlyle	Carlyle	Clinton	20	"	2 acres	6 ft.		
Frank Gundlach	"	"	"	20	"	2 "	6 "		
Wm. Gunn	Muncie	Muncie	Vermilion	20	"				

Conrad Long	Freeburg	Freeburg	St. Clair	20	Nov.	21	½	acre.	2½	ft.	
Thos. Liggott	Metropolis	Metropolis	Massac	20	"		1/10	"	6	"	
James A. McIlvaine	Sparta	Sparta	Randolph	20	"						
H. M. Marks	Huntley Grove	Huntley Grove	McHenry	20	"						
J. F. Monday	Lincoln	Lincoln	Logan	20	"						
J. J. Morris	Marley	Marley	Will	20	"						
S. T. Strattan	Mt. Vernon	Mt. Vernon	Jefferson	20	"		1	acre.	6	ft.	
B. W. Strattan	"	"	"	20	"		1	"	6	"	
C. W. Pavey				20	"		½	"	2	"	
J. B. McNair	Willow Hill	Willow Hill	Jasper	20	"		¾	"	2½	"	
J. N. McElvain	Nilwood	Nilwood	Macoupin	20	"		1	"	6	"	
Jno. McCleery	Baylis	Baylis	Pike	20	"		¾	"	5	"	
Peter Maller	Waterloo	Waterloo	Monroe	20	"	24					
Milton Newlin	Georgetown	Georgetown	Vermilion	20	"						
Wm. Weedham	Neoga	Neoga	Cumberland	20	"						
F. M. Newman	Beaucoup	Beaucoup	Washington	20	"						
Wm. L. North	May	May	Lee	20	"		⅛	acre.	2	ft.	
H. H. Oberschelp	Princeton	Princeton	Bureau	20	"						
F. Oswald	Alhambra	Alhambra	Madison	20	"						
Jno. Price	Oblong	Oblong	Crawford	20	"						
Geo. Zeigler	"	"	"	20	"		1	acre	5	ft.	
J. C. Robinson	Westfield	Westfield	Clark	20	"						
Jno. P. Roswell	Bunker Hill	Bunker Hill	Macoupin	20	"						
P. S. Reither	Nashville	Nashville	Washington	45	"		1⅛	acre	3	ft.	
Glenn Bros.	Hillsboro	Hillsboro	Montgomery	15	"		1½	"	18	"	
C. Rohrbough	Kinmundy	Kinmundy	Marion	15	"		¼	"	8	"	
John I. Spencer	Hamilton	Hamilton	Hancock	15	"						
Sawyer & McCracken	Nashville	Nashville	Washington	15	"		3	acres	4	ft.	
M. Schwartz	Urbana	Urbana	Champaign	15	"		¼	"	4	"	
J. Sees	Bloomington	Bloomington	McLean	15	"		1/10	"	5		
J. W. W. Sherman	Des Plaines	Des Plaines	Kane	15	"						
H. H. Oberschelp	Princeton	Princeton	Bureau	15	"		⅜	acre.	5½	ft.	
W. N. Stewart	Latona	Latona	Jasper	15	"		½	"	5	"	
Alex Smith	Newton	Newton	"	15	"						
H. Simmons	Vandalia	Vandalia	Fayette	15	"						
Edw. Talbot	Greenup	Greenup	Cumberland	15	"						
Fred Trautmann, Jr.	Caseyville	Caseyville	St. Clair	15	"		¼	acre.	2½	ft.	
F. Trautmann, Sr.	"	"	"	15	"		⅛	"	3	"	
Jno. M. Tonson	Alton	Alton	Madison	15	"		1	"	6	"	
Hy. O. Tonson	"	"	"	15	"		½	"	7	"	
Chas Terpining	Galesburg	Galesburg	Knox	15	"		1	"	2	"	
Chas H. Gardner	Elmwood	Elmwood	Peoria	15	"		½	"	5½	"	
Jno. Tunnell	Plainview	Plainview	Macoupin	15	"		½	"	7	"	
Simeon Vandermark	Bridgeport	Bridgeport	Lawrence	15	"		½	"	4	"	
Thos. Whitson	Woodstock	Woodstock	McHenry	15	"						
C. C. Colburn	Ingraham	Ingraham	Clay	20	"	21					
George Marley	"	"	"	20	"						
S. M. Colburn	"	"	"	20	"						
Samuel Cook	Carlinville	Carlinville	Macoupin	20	"						
George Carey	Rochelle	Rochelle	Lee	20	"		1	acre	2	ft.	
B. V. Carey	Robinson	Robinson	Crawford	20	"		⅓	"	3	"	
M. J. Dobshultz	Belleville	Belleville	St. Clair	20	"		1	"	6	"	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Shipm'nt	Area of Water.	Av. Depth	Character of Bottom.	Remarks.
Cyrus DeBolt	Ottawa	Ottawa	La Salle	20	Nov. 21	¼ acre	4 ft		
N. T. Eakin	Ora	Ora	Jackson	20	"				
H. A. Edson	Willow Hill	Willow Hill	Jasper	20	"	½ acre	4 ft		
Hon. Milo Erwin	Marion	Marion	Williamson	20	"				
V. E. Elmore	Ashland	Ashland	Cass	20	"	½ acre	9 ft		
Elijah D. Gwinn	Loraine	Loraine	Hancock	20	"	1 "			
T. L. Gilbert	Knoxville	Knoxville	Knox	20	"	½ "	3 ft		
C. H. Gardner	Elmwood	Elmwood	Peoria	20	"				
James Gaines	Ridge Farm	Ridge Farm	Vermilion	20	"				
G. W. Gaines	"	"	"	20	"				
Grace Russ	"	"	"	20	"				
John W. Gross	Rochester	Rochester	Sangamon	20	"	2 acres	7 ft		
J. D. Hilliard	Mt. Vernon	Mt. Vernon	Jefferson	20	"	1 "	6 "		
George Hackethal	Nameoki	Nameoki	Madison	20	"				
John T. Hewitt	Georgetown	Georgetown	Vermilion	20	"	¼ acre	4 ft		
J. G. Henldey	Baylis	Baylis	Pike	20	"				
Charles Hersman	Loami	Loami	Sangamon	20	"				
E. Hensinger	Burnt Prairie	Burnt Prairie	White	20	"				
T. H. Hinckle	Caseyville	Caseyville	St. Clair	20	"	⅛ acre	4 ft		
John Hinckle	"	"	"	20	"	¼ "	3 "		
John Hugely	Nashville	Nashville	Washington	20	"	1 "	5 "		
G. B. Hicks	Hardinsville	Hardinsville	Crawford	20	"	1 "	6 "		
Ezra Hinshaw	Bloomington	Bloomington	McLean	20	"	½ "	5 "		
N. B. Heafer	"	"	"	20	"	10 "	8 "		
G. W. Harbaugh	Foster Pond	Foster Pond	Monroe	20	"	½ "	3 "		
D. H. Hart	Pana	Pana	Christian	20	"				
W. H. Heaton	Keithsburg	Keithsburg	Mercer	20	"	⅛ acre	4 ft		
J. P. Hodge	Goleonda	Goleonda	Pope	20	"	6 "	3 "		
Peter Jacobs	Sparland	Sparland	Marshall	20	"				
S. S. B. Johnson	Sullivan	Sullivan	Moultrie	20	"				
Mrs. E. Kugler	Mill Brook	Mill Brook	Kendall	20	"				
H. H. King	Augusta	Augusta	Hancock	20	"				
Peter S. Nelson	Henderson	Henderson	Knox	20	"	½ acre	6 ft		
Edwin Nelson	"	"	"	20	"	½ "	6 "		
George Nelson	"	"	"	20	"	½ "	6 "		
W. Johnson	"	"	"	20	"	½ "	7 "		
Lewis Johnson	"	"	"	20	"	½ "	7 "		
H. S. Kiner	Geneseo	Geneseo	Henry	20	"	1¼ "	2½ "		
J. R. Challacombe	Hillsboro	Hillsboro	Montgomery	20	" 20	½ "	3 "		
Alex. A. Cre	"	"	"	20	"				
Wm. Law	Donnellson	Donnellson	"	20	"	¾ acre	12 ft		
Charles A. Ramsey	Hillsboro	Hillsboro	"	20	"				
Jacob Specht	Trenton	Trenton	Clinton	20	"	2 acres	7 ft		

S. L. Dickerson	West Liberty	West Liberty	Jasper	20	Nov.	20	½	acre	3	ft.	
J. G. Willsby	Pittsfield	Pittsfield	Pike	20	"		1	"	7	"	
W. R. Willsby	"	"	"	20	"		1	"	7	"	
T. Raltrieder	"	"	"	20	"		½	"	5	"	
J. M. Truitt	Hillsboro	Hillsboro	Montgomery	20	"		1	"	7	"	
J. M. Doran	Barry	Barry	Pike	20	"						
W. J. Kellam	West Liberty	West Liberty	Jasper	20	"		¾	acre	4	ft.	
John Kesler	Humerick	Humerick	Vermilion	20	"						
Jacob Jaret	"	"	"	20	"						
E. T. Stokes	"	"	"	20	"						
C. Lillerick & Sons	Gladstone	Gladstone	Henderson	20	"		¾	acre	7	ft.	
Lemuel McColm	Salem	Salem	Marion	20	"		¼	"	4	"	
Charles Retterer	Dorr	Dorr	McHenry	20	"		2	"	5	"	
A. V. Lisuby	Clinton	Clinton	DeWitt	20	"						
Egypt Milling Co.	Ashley	Ashley	Washington	20	"		½	acre	7	ft.	
James N. Handley	Humerick	Humerick	Vermilion	20	"						
E. R. E. Kimbrough	Danville	Danville	"	20	"						
Jacob Randall	Okawville	Okawville	Washington	20	"		⅛	acre	5	ft.	
Adam Randall	"	"	"	20	"		⅛	"	5	"	
Wm. Randall	"	"	"	20	"		⅛	"	5	"	
Edw. Randall	"	"	"	20	"		⅛	"	5	"	
Julius Neubauer	"	"	"	20	"		⅛	"	5	"	
H. A. Grimmer	Quincy	Quincy	Adams	20	"		⅛	"	4	"	
S. Price	Hardinsville	Hardinsville	Crawford	20	"	21	½	"	5	"	
John B. Schott	Quincy	Quincy	Adams	20	"						
Mrs. J. B. Schott	"	"	"	20	"						
E. H. Waldron	Lafayette, Ind	Lafayette, Ind	Tippecanoe	20	"		⅛	acre	4	ft.	
R. Roberts	Belvidere	Belvidere	Boone	20	"						
F. Amen	Clayton	Clayton	Adams	20	"						
C. M. Burgess	Bement	Bement	Piatt	20	"		1	acre	4	ft.	
W. W. Barr	Carbondale	Carbondale	Jackson	20	"		2	"	4	"	
James Brainard	Buda	Buda	Bureau	20	"		1/10	"	2	"	
Samuel Black	Fithian	Fithian	Vermilion	20	"						
Jerry Burtz	"	"	"	20	"						
John R. Thompson	"	"	"	20	"						
John R. Crowe	Waterloo	Waterloo	Monroe	20	"						
S. G. Chamness	Centerville	Centerville	Lawrence	20	"						
W. O. Converse	Springfield	Springfield	Sangamon	20	"						
H. H. Crane	Liter	Liter	Morgan	20	"		2½	acres	1	ft.	
George W. Colburn	Ingraham	Ingraham	Clay	20	"						
Jas. McDonald	Bethalto	Bethalto	Madison	20	"		2¾	acre	12	ft.	
F. W. L. Beck	"	"	"	20	"		2	"	15	"	
Patrick Conley	"	"	"	20	"		2¾	"	12	"	
H. O. Webber	"	"	"	20	"		3	"	10	"	
Wm. Benbow	"	"	"	20	"		3	"	10	"	
Wm. Meisler	"	"	"	20	"						
B. B. Ingraham	Flora	Flora	Clay	20	"		1	acre	4	ft.	
L. E. Boyer	Waddams Grove	Waddams Grove	Stephenson	20	"		1/5	"	4	"	
A. L. Balman	Wheeler	Wheeler	Jasper	20	"		1	"	4	"	
George Marcher	"	"	"	20	"		½	"	3	"	
P. A. Brady	Greenup	Greenup	Cumberland	20	"						
E. E. Spencer	Alma	Alma	Marion	20	"						

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
Frank Jennings	Gibson	Gibson	Ford	20	Nov. 20	1 acre	3 ft.		
Andrew Stollberg	Heinrichtown	Heinrichtown	St. Clair	20	"	3 "	5 "		
John P. Stollberg	"	"	"	20	"	3 "	5 "		
Martin J. Stollberg	"	"	"	20	"	3 "	5 "		
Henry C. Stollberg	"	"	"	20	"	3 "	5 "		
John M. Stollberg	"	"	"	20	"	3 "	5 "		
Geo. Stollberg	"	"	"	20	"	3 "	5 "		
J. H. Burns	Park Ridge	Park Ridge	Cook	20	"	½ "	6 "		
Jas. W. Greenwood	Loda	Loda	Iroquois	20	"				
W. C. Caldwell	Loami	Loami	Sangamon	20	"	1 acre	4 ft.		
J. F. Miller	Auburn	Auburn	"	20	"	⅛ "	5 "		
W. E. Lodge	Lodge Station	Lodge Station	Piatt	20	"				
J. F. Compton	Boos Station	Boos Station	Jasper	20	"	½ acre	6 ft.		
B. E. Whitlock	Herrick	Herrick	Shelby	20	"				
J. C. Whitlock	"	"	"	20	"				
Edward Cox	Fairview	Fairview	Fulton	20	"	¼ acre	3 ft.		
F. M. Taggart	Wayland	Wayland	Schuyler	20	"				
Hon. D. C. Taylor	Kankakee	Kankakee	Kankakee	20	"	3 acre	12 ft.		
R. N. Matheny	Greenup	Greenup	Cumberland	20	"				
Jacob Dickens	Aurora	Aurora	Kane	20	"				
Rev. T. Larson	Harmony	Harmony	McHenry	20	"				
H. Wakening	Lenzburg	Lenzburg	St. Clair	20	"	1 acre	10 ft.		
W. R. Decker	Sumner	Sumner	Vermilion	20	"				
John S. Jones	Advance Station	Advance Station	Jasper	20	"				
Julius Kuntz	Belleville	Belleville	St. Clair	20	"	¼ acre	4 ft.		
S. M. Sebkweches	"	"	"	20	"				
R. Poindexter	Thompsonville	Thompsonville	Franklin	20	"	¼ acre	1½ ft.		
W. B. Tribe	Albion	Albion	Edwards	20	"	⅛ "	3 "		
Patrick Nicholson	Lerna	Lerna	Coles	20	"	1/10 "	2 "		
Ernst Herrecke	LaSalle	LaSalle	LaSalle	20	"	½ "	6 "		
Chas. Herbold	"	"	"	20	"				
Jno. Groves	Atlanta	Atlanta	Logan	20	"	½ acre	4 ft.		
C. W. Wellington	Rushville	Rushville	Schuyler	20	"	1 "	4 "		
S. P. Hovey	Ogden	Ogden	Champaign	20	" 19	1 "	2 "		
W. Basitka	Utopia	Utopia	DuPage	20	"	¼ "	4 "		
Arthur Robinson	"	"	"	20	"	¼ "	4 "		
Fritz Meyer	"	"	"	20	"	¼ "	4 "		
S. B. Bowman	Hunt City	Hunt City	Jasper	20	"	1½ "	3 "		
John Bates	"	"	"	20	"				
S. N. Jennings	Mound Station	Mound Station	Brown	20	"	¼ acre	7 ft.		
T. J. Howell	Woodhull	Woodhull	Henry	20	"	½ "	3 "		
W. W. Warner	Warner Station	Warner Station	"	20	"	½ "	8 "		

James Harris, Jr.	Princeton	Princeton	Bureau	20	Nov.	19	½	acre	4	ft.	
Henry Seiter	Lebanon	Lebanon	St. Clair	20	"		½	"	6	"	
E. W. Cox	Bridgeport	Bridgeport	Lawrence	20	"		¼	"	4	"	
F. W. Henry	Windsor	Windsor	Shelby	20	"		1/10	"	5½	"	
James Burke	Brighton	Brighton	Jersey	20	"		2½	"	9	"	
John B. Fox	Blue Island	Blue Island	Cook	20	"		½	"	4	"	
C. A. Chittenden	Mendon	Mendon	Adams	20	"		¼	"	5	"	
John M. Bolt	Brighton	Brighton	Jersey	20	"		½	"	8	"	
R. R. Bourland	Peoria	Peoria	Peoria	20	"		½	"	3	"	
R. N. Bailey	"	"	"	20	"		¼	"	2	"	
Henry Benig	Smithton	Smithton	St. Clair	20	"		⅓	"	5	"	
Thomas Buck	Morris	Morris	Grundy	20	"	20					
W. W. Brown	Elmwood	Elmwood	Peoria	20	"		1½	acres	3	ft.	
D. H. Gray	"	"	"	20	"		1½	"	3	"	
C. F. Bowers	"	"	"	20	"		1½	"	3	"	
E. Vanpatten	"	"	"	20	"		1½	"	3	"	
S. S. Graham	"	"	"	20	"		1½	"	3	"	
Scott Clingham	"	"	"	20	"		1½	"	3	"	
W. W. Brown	"	"	"	20	"		1½	"	3	"	
S. E. Ellis	"	"	"	20	"		1½	"	3	"	
F. S. Camp	"	"	"	20	"		1½	"	3	"	
C. J. Bird	"	"	"	20	"		1½	"	3	"	
Thomas Gowery	Loraine	Loraine	Hancock	20	"						
D. W. Ewing	Mattoon	Mattoon	Coles	20	"		½	acre	3	ft.	
George Schaefer	Bushnell	Bushnell	McDonough	20	"						
Charles D. Durham	Danville	Danville	Vermilion	20	"		½	acre	15	ft.	
A. C. Daniel	"	"	"	20	"		½	"	15	"	
Samuel Beecher	Coleta	Coleta	Whiteside	20	"	15		"	2	"	
S. S. Cobb	"	"	"	20	"	15		"	2	"	
G. W. Howe	"	"	"	20	"	15		"	2	"	
J. S. Diels	"	"	"	20	"	15		"	2	"	
H. Hawkins	"	"	"	20	"	15		"	2	"	
W. C. Vincent	"	"	"	20	"	15		"	2	"	
F. W. Waddell	"	"	"	20	"	15		"	2	"	
Frank Bronson	"	"	"	20	"	15		"	2	"	
Byron London	"	"	"	20	"	15		"	2	"	
James Taylor	Mound Station	Mound Station	Brown	20	"	19	¼	"	5	"	
Henry Conklin	Carthage	Carthage	Hancock	20	"		¾	"	5	"	
J. S. Coffman	Taylorville	Taylorville	Christian	20	"		1½	"	7	"	
F. Gasecking	Shumway	Shumway	Effingham	20	"		½	"	4	"	
L. J. Kuntz	Belleville	Belleville	St. Clair	20	"		2	"	6	"	
Wm. Winkleman	"	"	"	20	"		½	"	6	"	
Lewis Barson	Sparland	Sparland	Marshall	20	"		¼	"	4	"	
George Davis	Mendon	Mendon	Adams	20	"		¼	"	5	"	
C. A. Bonvellet	St. Anne	St. Anne	Kankakee	20	"		1 1/10	"	4	"	
S. Snyder	Metamora	Metamora	Woodford	20	"						
John M. Bolt	Brighton	Brighton	Macoupin	20	"						
Hy. Ball	"	"	Jersey	20	"		¾	acre	6	ft.	
G. W. Fink	Pleasant Plains	Pleasant Plains	Sangamon	20	"		¾	"	6	"	
John N. Harrison	Salisbury	Salisbury	"	20	"						
C. F. Griffith	Macomb	Macomb	McDonough	20	"		½	acre	6	ft.	
W. S. Hendricks	St. Marys	St. Marys	Hancock	20	"		⅛	"	5	"	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date shipm'nt	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
M. Doppart	Stewardson	Stewardson	Shelby	20	Nov. 19	1 acre	3½ ft.		
Henry Mills	Georgetown	Georgetown	Vermilion	20	"	½ "	4 "		
Joshua Hedgecock	Plymouth	Plymouth	Hancock	20	"	1 "	2 "		
M. L. McClure	Danvers	Danvers	McLean	20	"	¾ "	3 "		
George W. Westlake	Pittsfield	Pittsfield	Pike	20	"				
Arthur Brown	"	"	"	20	"	1½ acres	1½ ft		
B. F. Westlake	"	"	"	20	"	1½ "	4½ "		
Reuben Allen	"	"	"	20	"	1½ "	4½ "		
C. F. Westlake	"	"	"	20	"	1½ "	4½ "		
George W. Westlake	"	"	"	20	"	1½ "	4½ "		
J. B. Wright	Sumner	Sumner	Lawrence	20	"	1½ "	4 "		
A. G. Barnes	Taylorville	Taylorville	Christian	20	"	¼ "	4 "		
Ben Barnes	"	"	"	20	"	¼ "	4 "		
John S. Punvea, Sr	Fairview	Fairview	Fulton	20	"	½ "	2½ "		
Wm. Perry	Milton	Milton	Pike	20	"				
C. L. Pfauschmidt	Barry	Barry	"	20	"	½ acre	6 ft.		
L. B. Clark	Elvaston	Elvaston	Hancock	20	"	⅝ "	3 "		
Thomas Buck	Saratoga	Saratoga	Grundy	20	"	1 "	2 "		
A. G. Preston	Mt. Carroll	Mt. Carroll	Carroll	20	"	1 "	6 "		
H. P. Edmons	Carthage	Carthage	Hancock	20	"	¼ "	5 "		
Jacob Strous	Sumner	Sumner	Lawrence	20	"	¾ "	8 "		
C. W. Redmon	Paris	Paris	Edgar	20	"	3½ "	3 "		
William J. Zimmerman	Harvel	Harvel	Montgomery	20	"				
Wade J. Zimmerman	"	"	"	20	"				
Edward Rimmerman	"	"	"	20	"				
Fred Zimmerman	"	"	"	20	"				
B. L. Cunningham	Sumner	Sumner	Lawrence	20	"	¼ acre	1 ft.		
A. M. McClain	Enfield	Enfield	White	20	"	⅛ "	3 "		
O. W. Gray	Noble	Noble	Richland	20	"	⅜ "	3 "		
F. Weigmann	Venedy	Venedy	Washington	20	"	¼ "	4 "		
F. A. Blume	"	"	"	20	"	¼ "	4½ "		
G. Schneider	"	"	"	20	"	½ "	5½ "		
F. Seiring	"	"	"	20	"	¼ "	4 "		
F. H. Rastrup	"	"	"	20	"	1 "	5 "		
E. W. Miller	Raymond	Raymond	Montgomery	20	"	¼ "	10 "		
W. E. Killam	Tower Hill	Tower Hill	Shelby	20	"				
Geo. Zeigler	Oblong	Oblong	Crawford	20	"	1 acre	5 ft.		
J. R. Beek	Assumption	Assumption	Christian	20	"				
Malinda McClure	"	"	"	20	"	½ acre	2½ ft.		
Thos D. Fox	Freeburg	Freeburg	St. Clair	20	"	½ "	3 "		
F. A. Wildeman	"	"	"	20	"	⅜ "	3 "		
E. Druehmueller	Bell Rive	Bell Rive	Jefferson	20	"	¼ "	5 "		
Geo. E. Krautzer	Colchester	Colchester	McDonough	20	"				

Geo Krysher	Makanda	Makanda	Jackson	20	Nov.	19					
A. M. Champ	Colchester	Colchester	McDonough	20	"	5	acres.	4	ft.		
D. Headon	LaHarpe	LaHarpe	Hancock	20	"	1/4	"	3	"		
Geo. Coulson	"	"	"	20	"	1/2	"	4	"		
W. E. Coquillette	"	"	"	20	"	3/24	"	4 1/2	"		
Wm. A. Glotfielder	Minier	Minier	Tazewell	20	"	1/2	"	4	"		
Elijah Wright	Chapman	Chapman	Montgomery	20	"	1/2	"	5	"		
John W. Latta	Greenup	Greenup	Cumberland	20	"						
Jas. Calder	Cornell	Cornell	Livingston	20	"	1/2	acre	4	ft.		
David Calder	"	"	"	20	"	1/2	"	4	"		
H. H. Gunn	Muncie	Muncie	Vermilion	20	"	1/4	"	2	"		
W. J. Meyer	Ocova	Ocova	Livingston	20	"	1/16	"	2	"		
A. A. Short	Perry	Perry	Randolph	20	"	1 3/4	"	5	"		
R. Bush	Mt. Sterling	Mt. Sterling	Brown	20	"	1/2	"	3	"		
P. T. Bush	"	"	"	20	"			4	"		
Peter Rigg	"	"	"	20	"	1/3	acre	4	"		
J. A. Smith	Scotia	Scotia	McDonough	20	"	1/4	"	3	"		
Hy. J. Davis	Freedom	Freedom	LaSalle	20	"						
Homer Wattles	West McHenry	West McHenry	McHenry	20	"	1	acre	2	ft.		
A. J. Pilchford	Irvington	Irvington	Washington	20	"	1/2	"	3 1/2	"		
Wm. Thompson	Effingham	Effingham	Effingham	20	"	1/2	"	5	"		
D. Heaton	Manchester	Manchester	Scott	20	"	1/4	"	4	"		
A. J. Famelle	Carrollton	Carrollton	Greene	20	"	1/4	"	4	"		
John M. Lewis	"	"	"	20	"						
J. P. Blakeley	Orion	Orion	Henry	20	"	1/2	acre	3	ft.		
Morris Kane	Watseka	Watseka	Iroquois	20	"	6	"	5	"		
C. Bigler	Sigel	Sigel	Shelby	20	"	1/5	"	4	"		
A. C. McMurphy	Makanda	Makanda	Jackson	20	"	1	"	5	"		
Henry Maharmot	Casner	Casner	Macon	20	"	1/10	"	4	"		
John Payson	LaHarpe	LaHarpe	Hancock	20	"						
A. Allison	Goodhope	Goodhope	McDonough	20	"	1/4	acre	5	ft.		
E. S. Robertson	Carbondale	Carbondale	Jackson	20	"	1/2	"	6	"		
Enoch J. Steward	Claremont	Claremont	Richland	20	"	1/2	"	3	"		
Benj. D. Fowler	"	"	"	20	"	1/2	"	3	"		
A. W. Fritchley	"	"	"	20	"	3/6	"	3	"		
N. B. Allen	"	"	"	20	"	1/2	"	3	"		
A. J. Bailey	Peoria	Peoria	Peoria	20	"	1/2	"	3	"		
B. L. I. Bourland	"	"	"	20	"	1/2	"	3	"		
W. G. Wilkins	Adair	Adair	McDonough	20	"	1	"	3	"		
J. C. Carr	Morris	Morris	Grundy	20	"	3/24	"	3	"		
C. M. Young	Monmouth	Monmouth	Warren	20	"	1/4	"	4 1/2	"		
S. H. Callaway	Orion	Orion	Henry	20	"	1/2	"	2	"		
M. M. Miller	Peoria	Peoria	Peoria	20	"	20	"	3	"		
I. N. Seamens	Bradbury	Bradbury	Cumberland	20	"	3/24	"	4	"		
J. E. Hugo Herman	Sigel	Sigel	Shelby	20	"	1/4	"	5	"		
A. S. Smart	Troy	Troy	Madison	20	"	1/2	"	3	"		
Geo. W. Anderson	"	"	"	20	"	1	"	2	"		
Jas. Wiswanger	Atlanta	Atlanta	Logan	20	"	1/4	"	4	"		
A. J. Holderman	Morris	Morris	Grundy	20	"	1/2	"	3 1/2	"		
J. L. McNeil	Parkersburg	Parkersburg	Richland	20	"	1 1/4	"	3	"		
J. M. Davis	Staunton	Staunton	Macoupin	20	"	1/4	"	6	"		
Hy. Fairfield	Newton	Newton	Jasper	20	"	1/2	"	1	"		

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
Austin Smith	Newton	Newton	Jasper	20	Nov. 19	½ acre	4 ft.		
Henry Kibler	"	"	"	20	"	½ "	4 "		
Oliver Britton	"	"	"	20	"	½ "	4 "		
E. A. Kibler				20	"	½ "	4 "		
C. B. McKinney	Irving	Irving	Montgomery	20	"	¼ "	6 "		
H. M. Keeley	"	"	"	20	"	⅛ "	4 "		
Chas. Perring	Macoupin	Macoupin	Macoupin	20	"	¼ "	3½ "		
L. B. Corbin	"	"	"	20	"	⅛ "	3½ "		
T. J. Middlecoff	Nokomis	Nokomis	Montgomery	20	"	½ "	4 "		
Jno. Snyder	Metamora	Metamora	Woodford	20	"	¾ "	6 "		
M. A. Shepard	Lebanon	Lebanon	St. Clair	20	"	¼ "	5 "		
Jno. C. Behrens	O'Fallon	O'Fallon	"	20	"	1 "	6 "		
J. W. River	Elmwood	Elmwood	Peoria	20	"	¾ "	5 "		
S. S. Will	Stillwell	Stillwell	Hancock	20	"	¼ "	4 "		
B. J. Manifeld	Dallas	Dallas	"	20	"	¼ "	5 "		
Mrs. I. H. Huffman	Stillwell	Stillwell	"	20	"	¼ "	5½ "		
E. S. Huffman	"	"	"	20	"	¾ "	5 "		
Wm. Wheeler	Carlinville	Carlinville	Macoupin	20	"	½ "	7 "		
M. M. Martin	Caledonia	Caledonia	Boone	20	"	¼ "	3 "		
S. J. Briggs	Minier	Minier	Tazewell	20	"	⅛ "	3½ "		
J. L. Briggs	"	"	"	20	"	⅛ "	3½ "		
J. B. McHose	Orion	Orion	Henry	20	"	⅛ "	2 "		
Wm. Siering	Venedy	Venedy	Washington	20	"	½ "	6 "		
Chas. Rudolph	"	"	"	20	"	½ "	5 "		
E. J. Stewart	Claremont	Claremont	Richland	20	" 16	½ "	6 "	Mud	
C. J. Lindly	Greenville	Greenville	Bond	20	"	½ "	8 "	Clay	
C. Lindly	"	"	"	20	"	½ "	8 "	"	
J. Lindly	"	"	"	20	"	½ "	8 "	"	
Cicero Lindly	"	"	"	20	"	½ "	8 "	"	
R. Lindly	"	"	"	20	"	½ "	8 "	"	
Wm. Allan	Claremont	Claremont	Richland	20	"	½ "	3 "	Mud	
Chilson Channon	Alexis	Alexis	Warren	20	" 2	½ "	5 "	Sand	
A. J. Baily	Peoria	Peoria	Peoria	20	"	½ "	3 "	Mud	
George Hayden	Jacksonville	Jacksonville	Morgan	20	"	¼ "	5 "	Sand	
B. T. Bourland	Peoria	Peoria	Peoria	20	"	½ "	3 "	Clay	
Lincoln Ice Co	Lake View	Chicago	Cook	25	" 5	"	30 "	"	
J. C. Carr	Morris	Morris	Grundy	20	"	¾ "	3 "	"	
Wm. Niemeyer	Mt. Olive	Mt. Olive	Macoupin	20	"	½ "	5 "		
Amos Meyer	Montrose	Montrose	Effingham	20	"				
Wallace Leigh	Jerseyville	Jerseyville	Jersey	20	"	1 acre	3 ft.	Mud	
J. H. Herman	Sigel	Sigel	Shelby	20	"	¼ "	5 "	Clay	
Jos. Peyton	Charleston	Charleston	Coles	20	" 1	"	3 "	Loam	

J. M. Davis	Staunton	Staunton	Macoupin	20	Nov.	16	1/20	acre.	2½	ft.	Mud
P. W. Mendenhall	Georgetown	Georgetown	Vermilion	20	"		¼	"	3	"	"
A. J. Farris	Waukegan	Waukegan	Lake	20	"		1	"	4¼	"	Black Soil
Hy. Meyer	Arlington Heights	Chicago	Cook	20	"		1	"	5½	"	Gravel
C. M. Roberts	Clay City	Clay City	Clay	20	"		⅓	"	3	"	Mud
J. T. Sargent	Carlinville	Carlinville	Macoupin	20	"		1	"	3	"	"
E. M. Sontag	Virden	Virden		20	"		¼	"	5	"	"
John T. Lee	Arthur	Arthur	Douglas	20	"		¼	"	2	"	Muck
H. A. Jones	Pittsfield	Pittsfield	Pike	20	"						
C. S. Casey	Clayton	Clayton	Adams	20	"		¾	acre.	4	ft.	Mud
A. R. Small	Pittsfield	Pittsfield	Pike	20	"		½	"	3	"	"
A. C. Matthews	"	"	"	20	"		½	"	3	"	"
S. Wilkes	"	"	"	20	"		½	"	3	"	"
J. B. Reeve	Shelbyville	Shelbyville	Shelby	20	"		⅔	"	4	"	Clay
A. E. Jordan	Hardin	Hardin	Calhoun	20	"		⅙	"	4	"	Mud
Jacob Paullin	Atlanta	Atlanta	Logan	20	"		7/20	"	5	"	Gravel
John Silex	Quincy	Quincy	Adams	20	"		½	"	3	"	Clay
Henry Silex	"	"	"	20	"		½	"	3	"	"
Sarah Silex	"	"	"	20	"		½	"	3	"	"
Martin Ahalt	"	"	"	20	"		½	"	3	"	"
S. D. Palmer	East Lynne	East Lynne	Iroquois	20	"		½	"	3	"	Mud
J. A. Palmer	"	"	"	20	"		½	"	3	"	"
J. S. Hickman	"	"	"	20	"		½	"	3	"	"
J. T. Hamilton	"	"	"	20	"		½	"	3	"	"
M. O'Brien	Joliet	Joliet	Will	20	"		½	"	4½	"	Rock
N. O. Primer	Athens	Athens	Menard	20	"		2½	"	4	"	Mud
Mary Converse	Springfield	Springfield	Sangamon	20	"		¼	"	3	"	"
Dr. G. C. Seibrock	Mascoutah	Mascoutah	St. Clair	20	"		¼	"	5	"	"
A. Hight	Bates	Bates	Sangamon	20	"			"	3	"	"
B. L. Funk	Neeleyville	Neeleyville	Scott	20	"		⅛	"	2	"	"
H. Caldwell	Bates	Bates	Sangamon	20	"		1	"	4	"	"
F. Hombustle	Shiloh Hill	Shiloh Hill	Randolph	20	"		½	"	3	"	Sand
Q. Burgessor	Clayton	Clayton	Adams	30	"		1½	"	5	"	"
Hy. S. Watson	Iola	Iola	Clay	20	"		1	"	2	"	Sod
E. R. Moore	Mounds	Mound Station	Brown	20	"						
A. Van Zile	Carthage	Carthage	Hancock	20	"		¼	acre.	4	ft.	Mud
Jas. Enfield	Mt. Sterling	Mt. Sterling	Brown	20	"		1	"	3½	"	"
G. P. Orendorff	Hopedale	Hopedale	Tazewell	40	"		⅕	"	5	"	Clay
G. Thompson	Teutopolis	Teutopolis	Effingham	20	"		⅓	"	4	"	Mud
Geo. H. Mittan	Bellefiower	Bellefiower	McLean	20	"		2	acres.	3	"	"
S. Teague	Woodland	Woodland	Iroquois	20	"		1	acre.	2½	"	"
John Snyder	Metamora	Metamora	Woodford	20	"		½	"	6	"	Clay
N. B. Wiggins	Springfield	Springfield	Sangamon	20	"		1	"	4	"	Mud
Wm. Werre	Wine Hill	Wine Hill	Randolph	20	"		1½	"	8	"	Clay
H. Wattles	McHenry	West McHenry	McHenry	20	"		1	"	2½	"	Mud
Jacob Whittmer	Summerfield	Summerfield	St. Clair	20	"		¼	"	5½	"	Clay
B. R. Bartlett	Peoria	Peoria	Peoria	20	"		1¼	"	3	"	Mud
N. W. Beauchamp	Kansas	Kansas	Edgar	20	"		1	"	6	"	Gravel
E. W. Killum	Muncie	Muncie	Vermilion	20	"		½	"	3	"	Mud
Green Arterburn	Kansas	Kansas	Edgar	20	"		1	"	6	"	Gravel
L. E. Slocum	Paris	Paris	"	20	"		⅓	"	4	"	Mud
P. K. Jones	West End	West End	Franklin	20	"		½	"	5	"	Dirt

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
Conrad Zeigler	Shawneetown	Shawneetown	Gallatin	20	Nov. 15	1½ acres.	4 ft.	Mud	
M. Coop	Enfield	Enfield	White	20	"	½ "	3 "	"	
Geo. Augler	Blandinsville	Blandinsville	McDonough	20	"	1 "	5 "	Sand	
L. Terrill	Jerseyville	Jerseyville	Jersey	20	"	½ "	4 "	Mud	
J. B. Seavers	Secor	Secor	Woodford	20	"	½ "	3 "	"	
Geo. A. Zeller	Spring Bay	Spring Bay	"	20	"	½ "	3½ "	"	
T. C. Smith	Irving	Irving	Montgomery	20	"	1¼ "	4 "	"	
Wm. Edgar	Jacksonville	Jacksonville	Morgan	20	"	1 "	4 "	"	
Wm. E. Smith	"	"	"	20	"	½ "	4 "	"	
Samuel Towner	Roodhouse	Roodhouse	Greene	20	"	½ "	4 "	"	
A. M. Zane	Colchester	Colchester	McDonough	20	"	1 "	5 "	"	
B. R. Kirk	Quincy	Quincy	Adams	20	"	½ "	1½ "	Mud	
Austin Sweet	Martinsville	Martinsville	Clark	20	"	¼ "	4 "	Clay	
J. G. Hubbard	Nokomis	Nokomis	Montgomery	20	"	¼ "	3 "	"	
E. Callahan	Robinson	Robinson	Crawford	20	"	¾ "	4 "	Earth	
L. E. Ross	Joliet	Joliet	Will	20	"	1¾ "	5 "	Gravel	
Wm. Aikman	Marion	Marion	Williamson	20	"	¼ "	5 "	Mud	
Thos. Donizen	"	"	"	20	"	¼ "	5 "	"	
Thos. Davis	"	"	"	20	"	¼ "	5 "	"	
J. A. Rogers	Atwater	Atwater	Macoupin	20	"	2 "	5 "	Clay	
E. Herman	Highland	Highland	Madison	20	"	1 "	3½ "	Mud	
E. B. Elrod	Flora	Flora	Clay	20	"	½ "	3 "	Clay	
Mrs. Jane Ingraham	"	"	"	20	"	½ "	3 "	"	
A. W. Bothwell	Clay City	Clay City	"	20	"	½ "	3 "	Mud	
Mrs. L. Tanner	Flora	Flora	"	20	"	½ "	3 "	"	
Fred Pearce	"	"	"	20	"	1 "	3 "	Clay	
C. D. Johnson	"	"	"	20	"	1 "	3 "	"	
J. Mills	Clay City	Clay City	"	20	"	1 "	3 "	"	
R. B. Kirkpatrick	La Harpe	La Harpe	Hancock	20	"	1½ "	3½ "	Mud	
D. C. Clossen	Casey	Casey	Clark	20	"				
M. A. Dennis	Shiloh Hill	Shiloh Hill	Randolph	20	"				
T. B. Rogers	"	"	"	20	"				
C. A. Dennis	"	"	"	20	"				
T. A. Chambers	Sparta	Sparta	"	20	"				
Rev. John Williams	Lake Creek	Lake Creek	Williamson	20	"				
H. A. Dorman	"	"	"	20	"				
Wm. L. Fowler	Marion	Marion	"	20	"				
Felix Parks	Crab Orchard	Crab Orchard	"	20	"				
James P. Mifflin	Marion	Marion	"	20	"				
Hon. J. M. Fowler	"	"	"	20	"				
F. M. Roberts	"	"	"	20	"				
John Huddleson	Crab Orchard	Crab Orchard	"	20	"				
M. McDonald	"	"	"	20	"				

A. Kelley	Lake Creek	Lake Creek	Williamson	20	Nov.	16						
J. T. Bedeker	"	"	"	20	"							
Capt. Fits	Parish	Parish	Franklin	20	"							
George F. Otto	La Harpe	La Harpe	Hancock	20	"							
D. M. Snyder	Galesburg	Galesburg	Knox	20	"							
E. R. Snyder	"	"	"	20	"							
Fred M. Snyder	"	"	"	20	"							
Scott Loring	Salem	Salem	Marion	20	"							
J. B. Manna	"	"	"	20	"							
W. L. Vickroot	Danvers	Danvers	McLean	20	"							
A. J. Brown	Jacksonville	Jacksonville	Morgan	20	"							
Levi Colburn	Ingraham	Ingraham	Clay	20	"							
Wm. Murphy	Lake Creek	Lake Creek	Williamson	20	"							
Scott Harris	"	"	"	20	"							
Fletcher Ferguss	"	"	"	20	"							
J. T. Sanders	Corinth	Corinth	"	20	"							
Hartwell Hendrickson	Marion	Marion	"	20	"							
Sidney Miflin	"	"	"	20	"							
Frank Otey	"	"	"	20	"							
William Warren	Bluffdale	Carrollton	Greene	20	"							
E. Raines	"	"	"	20	"							
H. K. Bothwell	Clay City	Clay City	Clay	20	"	½	acre	3	ft.	Mud		
Wm. Painter	Bluffdale	Carrollton	Greene	20	"							
Jacob Keller	"	"	"	20	"							
John Gamble	"	"	"	20	"							
R. Hasler	"	"	"	20	"							
Edw. May		"	"	20	"							
John Zwamenaeki	Crete	Crete	Saline	20	"							
A. G. Fiedmann	Freeburg	Freeburg	St. Clair	20	"							
N. J. Colburn	Ingraham	Ingraham	Clay	20	"							
Wm. S. Colburn	"	"	"	20	"							
John Trexler, Jr.	Wheeler	Wheeler	Jasper	20	"							
Chas. Millar	Williamsburg	Williamsburg	Shelby	20	"							
John M. Smith	Minonk	Dana	LaSalle	20	"							
John Tanner	Flora	Flora	Clay	20	"							
George W. Smith	"	"	"	20	"							
Randolph Smith	"	"	"	20	"							
G. A. Galispie	"	"	"	20	"							
W. A. Moore	"	"	"	20	"							
Wm. McMahan	"	"	"	20	"							
Isaac Southwick	"	"	"	20	"							
Joseph Mann	Jacksonville	Jacksonville	Morgan	20	"							
Ollie Bacon	"	"	"	20	"							
C. T. Race	Irving Park	Irving Park	Cook	30	"							
R. T. Race	"	"	"	20	"							
S. C. Wagner	Pana	Pana	Christian	20	"							
John Gerdes	Springfield	Springfield	Sangamon	20	"							
B. L. Funk	Neeleyville	Neeleyville	Morgan	20	"							
A. M. Seeley	Centralia	Centralia	Marion	20	"							
C. Sechrist	Watseka	Wat-eka	Iroquois	20	"							
G. B. Hicks	Hardinsville	Hardinsville	Crawford	20	"							
Samuel Tindall	Jacksonville	Jacksonville	Morgan	20	"							

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
E. Brailey	Carlinville	Carlinville	Macoupin	20	Nov. 16				
Conrad Walter	Welga	Welga	Randolph	20	"				
L. Wyman	Richton	Richton	Cook	20	"				
Frank W. Vose	Perry	Perry	Pike	20	"				
J. W. How	Carmi	Carmi	White	20	"				
Louis Mushnist	Chauncey	Sumner	Lawrence	20	"				
Chas. F. Ingalls	Sublette	Sublette	Lee	20	"				
Anderson Beaty	Benton	Benton	Franklin	20	"				
A. Snodgrass	Walnut Grove Stn	Walnut Grove Stn	Edgar	20	"				
J. R. Chittenden	Mendon	Mendon	Adams	20	"				
James Lynds	"	"	"	20	"				
A. N. Bain	Charleston	Charleston	Coles	20	"				
S. T. Wellman	Neoga	Neoga	Cumberland	20	"				
Capt. A. Wellman	"	"	"	20	"				
A. F. Stanfer	Sterling	Sterling	Whiteside	20	"				
H. Duty	Crab Orchard	Crab Orchard	Williamson	20	"				
Jos. Kelly	Lake Creek	Lake Creek	"	20	"				
Jno. F. Rowe	Brownstown	Brownstown	Fayette	20	"				
W. G. Adams	Glasgow	Glasgow	Scott	20	"				
W. J. G. Adams	"	"	"	20	"				
Paul Weidner	Wilsonburg	Noble	Richland	20	"				
D. S. Good	Shannon	Shannon	Carroll	20	"				
Dr. O. P. Norris	Laur	Ashley	Jefferson	20	"				
A. A. McClain	Enfield	Enfield	White	20	"				
D. T. Douglass	Colfax	Colfax	Warren	20	"				
James Monroe	Fairfield	Fairfield	Wayne	20	"				
W. I. McKenzie	Chester	Chester	Randolph	20	"				
R. B. Peak	Hamilton	Hamilton	Hancock	20	"				
Daniel Warner	Carmi	Carmi	White	20	"				
H. G. Easterly	Carbondale	Carbondale	Jackson	20	"				
Oscar Furst	Peoria	Peoria	Peoria	20	"				
P. Bradley	Carlinville	Carlinville	Macoupin	20	"				
R. B. Smith	Sherman	Sherman	Sangamon	20	"				
Chas. Allen	Berwick	Berwick	Warren	20	"				
Wm. G. Gates	Nunda	Nunda	McHenry	20	"				
Martin Neff	Petersburg	Petersburg	Menard	20	"				
Louis Kunze	Fayetteville	Fayetteville	St. Clair	20	"				
Michael Rine	Altona	Altona	Knox	20	"				
A. J. Beewitt	Flat Rock	Robinson	Crawford	20	"				
H. E. Eddleman	Dongola	Dongola	Union	20	"				
W. A. Allen	Greenville	Greenville	Bond	20	"				
F. S. Chapman	Jerseyville	Jerseyville	Jersey	10	"				
J. W. Teboo	Mound Station	Mound Station	Brown	20	"				

O. B. Wright	Orion	Orion	Henry	20	Nov.	16							
Fred Bushler	Centralia	Centralia	Marion	20	"								
Wm. Wundruck	"	"	"	20	"								
Oddy A. Brock	Fairfield	Fairfield	Wayne	20	"								
Rodney Lambert	Quincy	Quincy	Adams	20	"								
Thos. Bishop	Elgin	Elgin	Kane	20	"								
Isaac Frichler	Calhoun	Calhoun	Richland	20	"								
Mrs. L. A. Riner	Altona	Altona	Knox	20	"								
W. B. Smith	Galva	Galva	Henry	20	"								
J. C. Porterfield	Sidney	Sidney	Champaign	20	"								
G. W. LaMaster	Marion	Marion	DeWitt	20	"								
Jno. I. Spencer	Hamilton	Hamilton	Hancock	20	"								
J. M. Work	Bardolph	Bardolph	McDonough	20	"								
Geo. Langford	Bentley	Bentley	Hancock	20	"								
Jno. H. Langford	"	"	"	20	"								
Alex Schen	Gladstone	Gladstone	Henderson	20	"								
R. F. Wineman	Auburn	Auburn	Sangamon	20	"								
Henry Glazer	Quincy	Quincy	Adams	20	"								
H. M. Campbell	Edgewood	Edgewood	Effingham	20	"								
A. W. Griffith	Farm Ridge	Farm Ridge	LaSalle	20	"								
C. Harris	Dalson	Dalson	Clark	20	"								
Donald Simpson	Carrollton	arrollton	Greene	20	"								
Wm. F. Horton	Folger	Lena	Coles	20	"								
L. E. McGinnis	"	"	"	20	"								
J. S. Burns	Orion	Orion	Henry	20	"								
F. M. Selby	Willow Hill	Willow Hill	Jasper	20	"								
Ashley Knapp	Rockford	Rockford	Winnebago	20	"								
D. D. Euston	Mound Station	Mound Station	Brown	20	"								
James Wagey	Stones Prairie	Quincy	Adams	20	"								
L. Wagey	"	"	"	20	"								
M. D. Wagey	"	"	"	20	"								
B. Wagey	"	"	"	20	"								
F. Wagey	"	"	"	20	"								
[illegible]. Snodgrass	Lynn Gr. Springs	Lynn Gr. Springs	McDonough	20	"								
A. Snodgrass	"	"	"	20	"								
H. R. Collins	Iuka	Iuka	Marion	20	"								
County Poor Farm	Coatsburg	Coatsburg	Adams	100	"	3	acres	1	ft	Mud			
Thomas Borden	Cable	Cable	Mercer	20	"								
C. P. Collins	Iuka	Iuka	Marion	20	"								
John H. A. Hood	Centralia	Centralia	"	20	"								
Woodson Phlonix	"	"	"	20	"								
Albert Rittenhouse	"	"	"	20	"								
George H. Gullick	"	"	"	20	"								
A. R. Dempster	Quincy	Quincy	Adams	20	"								
H. T. Henning	"	"	"	20	"							For Bear Creek	
Lemley Brothers	"	"	"	40	"							" "	
E. B. McBride	Liberty	Liberty	"	20	"								
Dr. E. L. Sheldon	Union	Union	McHenry	20	"								
Benj. Cummings	Camp Point	Camp Point	Adams	20	"								
W. A. Glotfilter	Minier	Minier	Tazewell	20	"								
J. Ohls	Chicago	Chicago	Cook	20	"								
J. H. Bradley	"	"	"	20	"								

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
J. F. Stewart	Chicago	Chicago	Cook	20	Nov. 16				
G. H. McLaren	Saunemin	Astoria	Fulton	20	"				
E. E. Johnston	Peoria	Peoria	Peoria	20	"				
John W. Booth	Bardolph	Bardolph	McDonough	20	"				
John P. Cook	Westville	Westville	Vermilion	20	"				
Wesley Strief	Crab Orchard	Crab Orchard	Williamson	20	"				
Enoch Duncan	Corinth	Corinth	"	20	"				
John Mockaby	"	"	"	20	"				
Steven Harrison	Lake Creek	Lake Creek	"	20	"				
Moses Duty	Crab Orchard	Crab Orchard	"	20	"				
Philip A. Gundlach	Carlyle	Carlyle	Clinton	20	"	½ acre	3 ft.	Mud	
H. F. Pinnel	Kansas	Kansas	Edgar	20	"	¼ "	3½ "	"	
H. M. Marks	Huntley Grove	Huntley Grove	McHenry	20	"	1 "	4 "	Clay	
A. C. Gwinson	Casey	Casey	Clark	20	"	½ "	5 "	Mud	
S. G. Chamers	Carterville	Carterville	Williamson	20	"	½ "	4 "	"	
P. H. Grape	Greenville	Greenville	Bond	20	"	⅛ "	3 "		
P. O. H. Grape	"	"	"	20	"	¼ "	3 "		
D. M. Snyder	Abingdon	Abingdon	Knox	20	"	½ "	4½ "	Mud	
D. Snyder	"	"	"	20	"	½ "	4½ "	"	
Aaron Glick	Danville	Georgetown	Vermilion	20	"	½ "	3 "		
E. F. Bullock	Mt. Vernon	Mt. Vernon	Jefferson	20	"	¼ "	3 "	Mud	
Wm. Newberry	Bone Gap	Bone Gap	Edwards	26	"	½ "	3 "	"	
Thos. M. McDonald	Ellis Grove	Ellis Grove	Randolph	20	"	½ "	3 "	"	
C. H. Hoffman	Mendon	Mendon	Adams	20	"	1 "	3½ "	"	
J. L. Clayton	Vandalia	Vandalia	Fayette	20	"	¾ "	4 "	Clay	
Jas. Moore	Grape Creek	Danville	Vermilion	20	"	¼ "	4 "	Gravel	
G. C. Pearson	Danville	Danville	"	20	"	½ "	4 "	Mud	
J. E. Hugo Herman	Sigel	Sigel	Shelby	20	"	¼ "	4 "	"	
H. Hardner	Anna	Anna	Union	40	"	1 "	3 "	Clay	S. Ill. Hospital, Insane.
C. G. Gerherdt	Genesco	Atkins	Henry	20	"	1 "	4 "	"	
Randolph Heitland	Johannesburg	Johannesburg	Washington	20	"	1 "	5 "	Loam	
H. F. Bick	"	"	"	20	"	1 "	5 "	"	
N. Vortman	"	"	"	20	"	1 "	5 "	"	
Herman Kusting	"	"	"	20	"	1 "	5 "	"	
H. F. Peters	"	"	"	20	"	1 "	5 "	"	
H. F. Heckert	"	"	"	20	"	1 "	5 "	"	
Randolph Heckert	"	"	"	20	"	1 "	5 "	"	
T. E. [illegible]anaday	Shiloh Hill	Shiloh Hill	Randolph	20	"	⅛ "	4 "	Clay	
Jos. Kenworthy	Neoga	Neoga	Cumberland	20	"	¼ "	4 "	Mud	
F. M. Ehinehart	Effingham	Effingham	Effingham	20	"	½ "	5 "	Sand	
W. B. Jackson	Roodhouse	Roodhouse	Greene	20	"	4 "	6 "	Mud	

D. D. Easton	Mound Station	Mound Station	Brown	20	Nov.	16	⅓ acre	3	ft.	Mud	
S. C. Wagener	Ohlman	Pana	Montgomery	20	"		3 "	4½	"	Clay	
G. M. Selby	Willow Hill	Willow Hill	Jasper	20	"		¼ "	4	"	"	
M. Aigley	Lena	Lena	Stephenson	20	"		1 "	4	"	Mud	
Geo. H. Aigley	"	"	"	20	"		1 "	4	"	"	
J. E. Aigley	"	"	"	20	"		1 "	4	"	"	
D. Heaton	Manchester	Manchester	Scott	20	"		¼ "	4	"	"	
J. H. Horney	Cameron	Cameron	Warren	20	"		1¼ "	5	"	"	
B. F. Pease	Marion	Marion	Williamson	20	"		¾ "	3	"	Clay	
Leslie Cross	Jerseyville	Jerseyville	Jersey	20	"		½ "	6	"	"	
F. W. Battell	Mendon	Mendon	Adams	20	"		¼ "	3½	"	Mud	
W. W. Taylor	Macomb	Macomb	McDonough	20	"		⅙ "	3	"	Rock	
Wm. Venn	Alexis	Alexis	Warren	20	"		2½ "	5	"	Mud	
Charles Venn	"	"	"	20	"		2½ "	5	"	"	
G. W. Lancaster	Marion	Marion	Williamson	20	"		1/6 "	6	"	Clay	
John T. Thurman	Milton	Pearl	Pike	20	"		1 "	3	"	Mud	
C. F. Noftz	Kellerville	Kellerville	Adams	20	"		1/20 "	4	"	Clay	
John R. Snyder	Benson	Benson	Woodford	20	"		¾ "	3½	"	"	
S. H. Light	Scotland	Scotland	Edgar	20	"		1 "	6	"	"	
Capt. A. T. Wellman	Neoga	Neoga	Cumberland	20	"		¼ "	4	"	Earth	
G. G. Wellman	"	"	"	20	"		⅛ "	5	"	"	
Charles Wellman	"	"	"	20	"		⅛ "	5	"	"	
H. M. Campbell	Edgewood	Edgewood	Clay	20	"		1 "	3	"	Clay	
Isaac T. Lee	St. Joseph	St. Joseph	Champaign	20	"		½ "	3	"	Mud	
Maginnis & Boyle	Lake View	Chicago	Cook	40	"		5 "	40	"	Clay	
J. K. Waters	Odin	Odin	Marion	20	"		¼ "	5	"	Mud	
Charles Remhilt	Cutler	Cutler	Perry	20	"		1 "	9	"	Gravel	
George Remhilt	"	"	"	20	"		1 "	9	"	"	
Charles Tolle	Godfrey	Godfrey	Madison	20	"		½ "	4	"	Clay	
J. E. Jones	Danville	Danville	Vermilion	20	"		1¼ "	9	"	Mud	
D. T. Douglass	Colfax	Colfax	McLean	20	"		1½ "	6	"	Sand	
M. L. Douglass	"	"	"	20	"		1 "	4	"	Mud	
J. E. Fordyce	Bardolph	Bardolph	McDonough	20	"		1 "	5	"	Clay	
B. F. Beesley	Jacksonville	Jacksonville	Morgan	20	"		6 "	8	"	Gravel	
M. C. Shirley	Staunton	Staunton	Macoupin	20	"		2 "	8	"	Clay	
D. W. Green	Barry	Barry	Pike	20	"		1 "	3	"	"	
Louis M. Hoblit	Atlanta	Atlanta	Logan	20	"		2½ "	4	"	Clay	
J. P. Eurect	Mendon	Mendon	Adams	20	"		¼ "	3½	"	"	
Bailey Grover	Odell	Odell	Livingston	20	"		¼ "	9	"	"	
Wm. J. Wilkinson	Wilmington	Wilmington	Greene	20	"		1¼ "	6	"	Mud	
J. W. Beard	DuQuoin	DuQuoin	Perry	20	"		2 "	4	"	"	
T. S. Merryman	New Windsor	New Windsor	Mercer	20	"		½ "	3½	"	Gravel	
Red Mill Co.	Joliet	Joliet	Will	40	"		10 "	7	"	Mud	
Clinton Fuller	Elmira	Elmira	Stark	20	"		2½ "	2	"	"	
John Fordyce	Berrick	Berrick	Warren	20	"		¼ "	3½	"	Clay	
Samuel Lee	Sannemin	Sannemin	Livingston	20	"		3 "	4½	"	Sand	
R. D. Adams	Fairfield	Fairfield	Wayne	20	"		2 "	14	"	"	
R. D. Adams	"	"	"	20	"		2 "	14	"	"	
R. D. Adams	"	"	"	20	"		2 "	14	"	"	
R. D. Adams	"	"	"	20	"		2 "	14	"	Clay	
Andrew Deminger	Pinckneyville	Pinckneyville	Perry	20	"		½ "	5½	"	Mud	
Ed L. Pettijohn	Rinard	Rinard	Wayne	20	"	17	⅜ "	3	"	Gravel	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Ship'nt.	Area of Water.	Av. Depth	Character of Bottom.	Remarks.
Milton Scott	Scotland	Scotland	Edgar	20	Nov. 17	½ acre	3 ft.	Mud	
Joseph Spate	Freeburg	Freeburg	St. Clair	20	"	1 "	8 "	"	
Anton Heilman	"	"	"	20	"	1 "	9 "	"	
Mike Spate	"	"	"	20	"	1 "	8 "	"	
F. M. Kirby	Atwood	Atwood	Douglas	20	"	1 "	5 "	"	
S. G. Rook	Denver	Denver	Hancock	20	"	1 "	4 "	Clay	
C. L. Crowell	Peoria	Peoria	Peoria	20	"	¼ "	3 "	"	
S. H. Calloway	Orion	Orion	Henry	20	"	1 "	4 "	Mud	
D. C. Wachtel	Lanark	Lanark	Carroll	20	"	4 "	4 "	"	
G. W. Noble	"	"	"	20	"	¾ "	3 "	"	
J. C. Button	Ridgefield	Ridgefield	McHenry	20	"	5 acres	3½ "	"	
A. A. Sheffield	Grand De Tour	Grand De Tour	Ogle	20	"				Well temporarily
H. S. Wineman	Auburn	Auburn	Sangamon	20	"	1 acre	6 ft.	Clay	
A. Althouse	Parkersburg	Parkersburg	Richland	20	"	½ acre	6 "	"	
E. L. Stevens	Joliet	Joliet	Will	20	"	⅛ "	3½ "	Rock	
Joliet Stone Co	"	"	"	20	"	1 "	6½ "	"	
A. E. Meyers	Millbrook	Millbrook	Kendall	20	"	¼ "	2½ "	Mud	
W. H. Larton	Jacksonville	Jacksonville	Morgan	20	"	6 acres	8 "	Clay	
Henry Lurton	"	"	"	20	"	3 "	8 "	Clay and loam	
Nicholas Leister	Green Valley	Green Valley	Tazewell	24	"	½ acre	3½ "	Mud	
Peter Singer	Woodstock	Greenwood	McHenry	20	"	3 acres	4 "	Loam	
Chas Pope	Geneva	Geneva	Kane	20	"	¾ acre	2 "	Gravel and mud	
J. H. Carpenter	Neponset	Neponset	Bureau	20	"	1⅜ "	4 "	Loam	
Chas. Knehmer	Carmi	Carmi	White	20	"	¾ "	6 "	Clay	
Simon Elbert	Sannemin	Sannemin	Livingston	20	"	⅛ "	2½ "	"	First lot lost
M. Abbott	Verona	Verona	Grundy	20	"	½ "	1½ "	"	
Stephen D. Keek	Aurora	Aurora	Kane	20	"	1 acres	2½ "	Mud	
Wm. Wilson	Caledonia	Caledonia	Boone	20	"	½ acre	1½ "	"	
A. W. Griffith	Grand Ridge	Grand Ridge	LaSalle	20	"	⅛ "	3 "	"	
H. B. Douglass	Aurora	Aurora	Kane	20	"	¼ "	3 "	"	
Robt. Hilliard	"	"	"	20	"	½ "	2½ "	"	
Alex Koelmel	Blue Mound	Blue Mound	Macon	20	"	1 "	3 "	Clay	
Lydia A. Johnson	Pearl	Pearl	Pike	20	"	½ "	2½ "	"	
David Johnson	"	"	"	20	"	1 "	2 "	"	
Louis A. Klaner	Quincy	Quincy	Adams	40	"	¾ "	6 "	Mud	
M. Cavenaugh	Decatur	Decatur	Macon	20	"	3 acres	3 "	"	
John Gorden	Jacksonville	Jacksonville	Morgan	20	"	1 acre	4 "	"	
S. W. Heaton	"	"	"	20	"	1 "	4 "	"	
Geo. T. Hamilton	"	"	"	20	"	1 "	1 "	"	
L. N. Brewer	Toledo	Toledo	Cumberland	20	"	2 acres	4½ ft.	Clay	
N. L. Tabler	Minooka	Morris	Grundy	20	"	½ acre	2 "	"	
John Hartan	Mendota	Mendota	LaSalle	20	"	⅛ "	4½ "	"	
R. R. Barnes	Bunker Hill	Bunker Hill	Macoupin	20	"	1 "	5½ "	Mud	

Frank Jennings	Gibson	Gibson	Ford	40	Nov.	17	1	acre	3	ft.	Mud	
C. H. Cottrell	Sycamore	Sycamore	DeKalb	20	"		1½	"	2½	"	"	
Wm. Gundlach	Columbia	Columbia	Monroe	20	"		½	"	5½	"	"	
John Gundlach	"	"	"	20	"		1	"	6	"	"	
Henry Meyer	Arlingt'n Heights	Chicago	Cook	20	"		1	"	5½	"	Clay	
Wilson Large	Newton	Newton	Jasper	20	"		¼	"	2	"	Mud	Water Cresses
Henry Erdsick	Camp Point	Camp Point	Adams	20	"		1	"	5	"	"	
Hanna Erdsick	"	"	"	20	"		1	"	5	"	"	
Fred Erdsick	"	"	"	20	"		1	"	5	"	"	
Kate Erdsick	"	"	"	20	"		1	"	5	"	"	
C. E. Johnson	Alta	Alta	Peoria	20	"		11	"	1	"	Mud	
E. W. Tucker	Eugene	Elmwood	Knox	20	"		½	"	4	"	"	
J. E. Fordyce	Berrick	Berrick	Warren	17	"		¼	"	3½	"	Sand	For brother
Jno. H. Harrison	Springfield	Springfield	Sangamon	20	"		¾	"	4½	"	Mud	
W. W. Warner	Warner	Warner	Henry	20	"		⅔	"	10	"	Sand	
Peter C. Wood	Coffeen	Coffeen	Montgomery	20	"		1	"	3½	"	Mud	
Wm. Whiting	Phillipstown	Phillipstown	White	20	"		1	"	1	"	Clay	
D. Lambert	Quincy	Quincy	Adams	20	"							
Fred Zimmerman	Perry	Perry	Pike	20	"		¼	acre	3	ft.	Mud	
J. Fritschier	Calhoun	Calhoun	Richland	20	"		½	"	6	"	Clay	
J. C. Peeler	Belknap	Belknap	Johnson	22	"		½	"	6	"	Mud	
C. P. Cooper	Richview	Richview	Washington	20	"		¼	"	8	"	Clay	
R. F. Beals	Oneida	Oneida	Knox	20	"		½	"	3	"	Grass	Pond in Henry county.
Stephen Clark	Brimfield	Brimfield	Peoria	20	"		½	"	6	"	Gravel	
J. W. Gale	Volo	Volo	Lake	20	"		150	"	8	"	Mud	
H. G. Easterly	Carbondale	Carbondale	Jackson	20	"		½	"	6	"	Clay	
Jones Tontz	Grant Fork	Highland	Madison	20	"		1⅝	"	5½	"	"	
Michael Humes	Colchester	Colchester	McDonough	20	"		1	"	2½	"	Gravel	
Wm. Dobler	Wyanet	Wyanet	Bureau	20	"		3	"	12	"	Soil	
Wm. A. Greenless	Ottawa	Ottawa	LaSalle	20	"				5	"	Mud	
J. & A. Dickhut	Fowler	Fowler	Adams	10	"		1⅛	"	4	"	Hard	
Aug Iberg	Highland	Highland	Madison	20	"							
Wm. Halley	Rockton	Rockton	Winnebago	20	"		½	acre	2½	ft.	Mud	
Henry Ketzley	Reynolds	Reynolds	Mercer	20	"		¾	"	4½	"	Muck	
D. Roger	Stillwell	Stillwell	Hancock	20	"		¼	"	5	"	Clay	
J. C. Zeigler	Carmi	Carmi	White	20	"							
Mrs. W. R. Butler	Stillwell	Stillwell	Hancock	20	"		¼	acre	5	ft.	Clay	
Christian Canborg	Adrian	Adrian	"	20	"		¼	"	2	"	Loam	
Jno. Cook	Collinsville	Collinsville	Madison	20	"		1	"	5	"	Red clay	
Christi n Bigler	Sigel	Sigel	Shelby	20	"		¼	"	6	"	Mud	
Jacob Moser	"	"	"	20	"		½	"	4	"	"	
R. F. Giefling	Cullom	Griswold	Livingston	20	"		1	"	2½	"	"	
Jno. P. Plane	Greenview	Greenview	Menard	20	"		⅛	"	4	"	Clay	
Jas. P. Lockard	Marshall	Marshall	Clark	20	"		½	"	5	"	"	
J. C. B. Heaton	New Burnside	New Burnside	Johnson	20	"		1	"	6	"	"	
S. P. Thacker	Vienna	Vienna	"	20	"		1 1/10	"	4	"	"	
Peter Herman	Peoria	Peoria	Peoria	20	"		½	"	6	"	"	
Jno. Rollings	Neoga	Neoga	Cumberland	20	"		1	"	3	"	Mud	
Albert Buckner	"	"	"	20	"		¼	"	4	"	"	
Jno. T. Kinney	"	"	"	20	"		1	"	3	"	"	
David Kinney	"	"	"	20	"		1	"	3	"	"	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
A. D. Bray	Neoga	Neoga	Cumberland	20	Nov. 17	½ acre.	3 ft.	Mud	
Fred Kinney	"	"	"	20	"	¼ "	1 "	"	
Jessie Evans	Saybrook	Saybrook	McLean	20	"				
Monroe Dillon	Dongola	Dongola	Union	20	"	1 acre.	4 ft.	Mud	
John Wilkes	Columbus	Quincy	Adams	20	"				
F. M. Smith	Shelbyville	Shelbyville	Shelby	20	"				
Dr. John Neapes	Paris	Paris	Edgar	20	"				
J. H. Duker	Quincy	Quincy	Adams	20	"				
Theo. Duker	"	"	"	20	"				
George Kimball	Champaign	Champaign	Champaign	20	"				
M. L. T. Sturgeon	Taylor Ridge	Taylor Ridge	Rock Island	20	"				
R. A. Stickley	Macomb	Macomb	McDonough	20	"				
Amos Meyers	Gila, Jasper Co	Montrose	Effingham	20	"				
L. D. Foltz	" "	"	"	20	"				
Samuel Wean	Forsythe	Forsythe	Macon	20	"				
Henry Font	Chrisman	Chrisman	Edgar	20	"				
C. S. Curry	Clayton	Clayton	Adams	20	"				
N. B. Challant	Pana	Pana	Christian	20	"				
G. White	Newton	Newton	Jasper	20	"				
D. Flemmigan	Savanna	Savanna	Carroll	20	"				
Jesse Evans	Saybrook	Saybrook	McLean	20	"				
Richard Lee	DuQuoin	DuQuoin	Perry	20	"				
M. L. Gustin	West Liberty	West Liberty	Jasper	20	"				
Hy. A. Gren	Okawville	Okawville	Washington	20	"				
J. B. Siefman	Venl	Teutopolis	Effingham	20	"				
J. G. Willard	Decatur	Decatur	Macon	20	"				
J. G. Willard, Jr	"	"	"	20	"				
J. T. Swan	Harmon	Harmon	Lee	20	"				
Ransom Ressinger	Pearl	Pearl	Pike	20	"				
Lafayette Lamb	Jacksonville	Jacksonville	Morgan	20	"				
R. F. Burk	Golden	Golden	Adams	20	"				
Joseph Thirlwell	Galesburg	Galesburg	Knox	20	"				
E. Farer	Woodstock	Woodstock	McHenry	20	"				
James M. Stewart	Carlyle	Carlyle	Clinton	20	"				
Albert Bigler	Sigel	Sigel	Shelby	20	"				
T. J. Rice	Pinckneyville	Pinckneyville	Perry	20	"				
J. D. Levy	Quincy	Quincy	Adams	100	"	3 acres	1½ ft.	Clay	Public waters
Hy. Gren, sr.	Okawville	Okawville	Washington,	20	"				
J. W. Gale	Volo	Volo	Lake	20	"				
Frank L. McCracken	Wadsworth	Wadsworth	"	20	"				
Hy. DeWerff	Moro	Moro	Madison	20	"				
C. J. Inness	Galesburg	Galesburg	Knox	20	"				
S. M. Gordon	Odin	Odin	Marion	20	"				

H. W. Hall	Flint	McLeansboro	Hamilton	20	Nov.	17				
Wm. Yost	Eldorado	Eldorado	Saline	20	"					
J. B. Proudfit	Enfield	Enfield	White	20	"					
Wm. McKenzie	Chester	Chester	Randolph	20	"					
Robert McKenzie	"	"	"	20	"					
Orin Gibson	Mazon	Mazon	Grundy	20	"					
G. W. Bates & Son	Versailles	Versailles	Brown	40	"	1½ acres.	3½ ft.	Mud		
Geo. H. Monroe	Joliet	Joliet	Will	20	"					
Mrs. Mary Pittman	Springfield	Springfield	Sangamon	20	"					
J. L. Clayton	Vandalia	Vandalia	Fayette	20	"					
Louis Klaner	Fairweather	Fairweather	Adams	40	"					
O. H. Barnett	Clayton	Clayton	"	20	"					
D. H. Rowe	Martinville	Martinville	Clark	20	"					
C. G. Taylor	Decatur	Decatur	Mason	20	"					
A. S. Waltz	"	"	"	20	"					
M. B. Harrison	Mound Station	Mound Station	Brown	20	"					
H. J. Hartman	Crete	Crete	Will	20	"					
H. Combs	Lloyd	Lloyd	Menard	20	"					
Jas. Statler	Good Hope	Good Hope	McDonough	20	"					
Wm. F. Horton	Folger	Lena	Stephenson	20	"					
Mrs. C. R. Conant	Paw Paw	Paw Paw	Lee	20	"					
Wm. T. Conant	"	"	"	20	"					
M. E. Conant	"	"	"	20	"					
Sarah Conant	"	"	"	20	"					
Fred Hug	Highland Park	Quincy	Adams	50	"				Public waters	
Dr. E. Gunther	"	"	"	50	"				" "	
J. D. Perry	Quincy	"	"	50	"					
Mike Sullivan	Hersman	Hersman	Brown	20	"					
Mike McInter	Mt. Sterling	Mt. Sterling	"	20	"					
Claiborne Wright	Mason	Mason	Effingham	20	"					
Wm. Booth	Camp Point	Camp Point	Adams	20	"					
Jno. Black	Clayton	Clayton	"	20	"					
Solomon Touts	Yantisville	Yantisville	Shelby	50	"					
Christian Inglehart	Baldwin	Baldwin	Randolph	20	"					
G. Brideing	Quincy	Quincy	Adams	20	"					
Mrs. G. Brideing	"	"	"	20	"					
C. J. Risler	Owaneco	Owaneco	Christian	20	"					
M. Cavanaugh	Decatur	Decatur	Macon	20	"				U. S. list	
M. V. B. Wachtel	Lanark	Lanark	Carroll	20	"					
Wm. Oliver	Norris City	Norris City	White	55	"					
S. A. Crossman	Warrensburg	Warrensburg	Macon	20	"					
J. W. Roberts	Franklin	Franklin	Morgan	20	"					
Isaac N. Simpson	Benton	Benton	Franklin	20	"					
J. C. Peebles	Chesterfield	Chesterfield	Macoupin	20	"					
Jos. Pfister	Belle Prairie	Dahlgren	Hamilton	20	"					
Anton Dunder	Centralia	Centralia	Marion	20	"					
Emile Buehler	"	"	"	20	"					
Geo. Breuning	"	"	"	20	"					
Otto Gehrig	Alhambra	Alhambra	Madison	20	"				Public waters	
Wm. DeHart	Carthage	Carthage	Hancock	20	"					
B. M. Axtell	Wilmington	Wilmington	Will	20	"					
W. H. Phillips	Odin	Odin	Marion	20	"	18	½ acre.	3	ft. Mud	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth	Character of Bottom.	Remarks.
A. W. Turpenning	Utah (Warren co.)	Galesburg	Knox	20	Nov. 18	1 acre	3½ ft.	Clay	
Geo. H. Meadows	Olney	Olney	Richland	20	"	½ "	4 "	Sand	
Jno. Forsha	Baileyville	Baileyville	Stephenson	20	"	¼ "	4 "	Mud	
M. C. Stanley	Jerseyville	Jerseyville	Jersey	20	"	⅓ "	5 "	Clay	
Jno. Swansen	New Windsor	New Windsor	Mercer	20	"	½ "	3 "	Mud	
Jas. G. Strawn	Orleans	Orleans	Morgan	20	"	¾ "	3 "	"	
Jno. T. Frazee	Ridgeville	Ridgeville	Iroquois	20	"	⅛ "	4 "	Clay	
L. L. Ratkin	Swan Creek	Swan Creek	Warren	20	"	¼ "	4 "	Mud	
G. W. Gardner	Mendota	Mendota	LaSalle	20	"	1 "	3½ "	"	
O. S. Jarvis	Xenia	Xenia	Clay	20	"	¼ "	3 "	"	
G. W. Lanister	Marion	Marion	Williamson	20	"	¼ "	6 "	Clay	
Dan'l Estel	Coatsburg	Coatsburg	Adams	20	"	½ "	4 "	"	
Jno. Sharer	Mt. Morris	Mt. Morris	Ogle	20	"	100 "	14 "	"	
A. N. Cherry	Tioga	Tioga	Hancock	20	"	⅛ "	4 "	Mud	
A. P. Cooney	Durand	Durand	Winnebago	20	"	1/10 "	4 "	"	
Thos. Blanchard	Flora	Flora	Clay	20					
Jackson Trexler	Wheeler	Wheeler	Jasper	20	"	½ acre	5 ft.	Clay	
E. G. Douglass	Elgin	Elgin	Kane	20	"	2 "	4 "	Mud	
S. M. Mitchell	Thompson (Franklin co)	Corinth	Williamson	20	"	¾ "	4 "	Clay	
Chas. Shamel	Willey Station	Stonington	Christian	20	"	1/10 "	4½ "	Mud	
Jno. Bowles	Chrisman	Chrisman	Edgar	20	"	1 "	5 "	Clay and sand	
Jas. Thrapp	West Liberty	West Liberty	Jasper	20	"	¼ "	4½ "	"	
Dr. J. G. Baker	Cottage Home	Makanda	Williamson	20	"	¼ "	3½ "	Clay and gravel	
A. P. Baker	"	"	"	20	"	¼ "	3 "	Clay	
M. D. Baker	Makanda	"	Jackson	20	"	½ "	4 "	"	
Ella Tabler	Minooka	Morris	Grundy	20	"	½ "	2 "	"	
A. J. Monroe	Cook's Mills	Arcola	Coles	20	"	¼ "	4½ "	"	
Geo. W. Kimball	Paris	Paris	Edgar	20	"	1 "	4 "	Loam	
Richard M. Rice	DuBois	DuBois	Washington	20	"	1 "	3 "	Mud	
Jas. M. Petty	Pittsfield	Pittsfield	Pike	20	"	¼ "	4 "	"	
Geo. Trippel	Trenton	Trenton	St. Clair	20	"	½ "	8 "	Dirt	
Emma Wiley	DuQuoin	DuQuoin	Perry	20	"	¾ "	4 "	Gravel	
H. E. Wiley	"	"	"	20	"	¼ "	3 "	Clay	
W. S. Spotts	"	"	"	20	"	¾ "	4 "	Gravel	
Sylvester Holbrooks	Oakland	Oakland	Douglas	20	"	⅛ "	2 "	"	
Geo. G. Wiley	DuQuoin	DuQuoin	Perry	20	"	⅛ "	4 "	"	
H. P. Burroughs	Elkville	Elkville	Jackson	20	"	10 "	4 "	Mud	
Jno. B. Hoffmer	Dongola	Dongola	Union	20	"	3 "	4 "	Sand	
Stephen Bardill	Grant Fork	Grant Fork	Madison	20	"	¼ "	3 "	"	
T. V. Henry	Windsor	Windsor	Shelby	20	"	¼ "	5 "	Mud	
J. W. McCreery	Thompsonville	Thompsonville	Franklin	20	"	½ "	4½ "	Clay	
G. G. Nighbort	Barr's Store	Palmyra	Macoupin	20	"	1¼ "	4 "	Mud	

P. B. Sarr	Wyanet	Wyanet	Bureau	20	Nov.	18	4	acres.	3½	ft.	Sand		
E. Milling Co.	Ashley	Ashley	Washington	20	"		¼	"	5	"	Mud		
C. M. Gibbs	Quincy	Quincy	Adams	20	"	19	1½	"	4	"	"	Deed to app	
John L. Nichols	Carlyle	Carlyle	Clinton	20	"		1	"	5½	"	"		
L. McColen	Salem	Salem	Marion	20	"								
S. L. Henry	Windsor	Windsor	Shelby	20	"		1	acre	5	ft.	Mud		
J. H. Zumstein	"	"	"	20	"		1	"	5	"	"		
W. W. McVey	"	"	"	20	"		1	"	5	"	"		
S. Snyder	"	"	"	30	"		1	"	5	"	"		
D. W. Tranested	Crab Orchard	Crab Orchard	Williamson	20	"		½	"	3½	"	"		
Ellen Thacker	Vienna	Vienna	Johnson	20	"		⅛	"	3½	"	Clay		
G. N. Thacker	"	"	"	20	"		⅛	"	4	"	Gravel		
Wm. C. Dodd	Marion	Corinth	Williamson	20	"		½	"	3	"	Mud		
F. N. Newman	Ashley	Ashley	Washington	20	"		½	"	5	"	Dirt		
Wm. S. Lurton	Jacksonville	Jacksonville	Morgan	20	"	6		"	8	"	Blk. loam & clay		
G. W. Langford	Havana	Forest City	Mason	40	"	5		"	6	"	Mud		
Jos. Niseranger	Atlanta	Atlanta	Logan	20	"		¼	"	4	"	"		
D. W. Dean	Summer Hill	Rockport	Pike	20	"		⅛	"	5½	"	"		
S. G. Gardiner	Kane	Kane	Greene	20	"		⅛	"	4	"	Clay		
C. J. Bryant	Millersburg	Millersburg	Mercer	20	"		⅛	"	5	"	"		
Geo. Dobson, Sr.	Cerro Gordo	Cerro Gordo	Piatt	20	"		1/16	"	3½	"	"		
W. H. Brackenridge	Versailles	Versailles	Brown	50	"		1½	"	4	"	"	Railroad reservoir	
H. F. Newman	Staunton	Staunton	Macoupin	20	"		⅖	"	7	"	"		
Ed Mayo	Pleasant Mound	Smithboro	Bond	20	"		⅛	"	4	"	Mud		
M. O. Thompson	Kane	Kane	Greene	20	"		⅛	"	4	"	"		
Clyde Curlie	Tamarand	Tamarand	Perry	20	"	20	¼	"	5	"	Clay		
John B. Seward	Raymond	Raymond	Montgomery	20	"	1		"	6	"	Sod		
Peter Root	Rushville	Rushville	Schuyler	20	"		⅛	"	3	"	Clay		
Jones Tontz	Grant Fork	Salem	Madison	30	"		1/16	"	5½	"	"	To replace	
B. Riley	Wilmington	Wilmington	Will	20	"	1		"	12	"	Rock		
A. R. Stickle	Macomb	Macomb	McDonough	20	"		¼	"	4	"	Clay		
Luther Woodruff	Joliet	Joliet	Will	30	"		⅓	"	3	"	Gravel		
E. L. Stevens	"	Channelson	"	20	"	3		"	5	"	Mud		
D. W. Beeby	"	New Lenox	"	20	"	3		"	3	"	"		
Isaac Nobes	"	Joliet	"	20	"	1		"	4	"	Rock		
L. E. Ingals	"	"	"	20	"		1/16	"	3	"	Gravel		
A. P. Stevens	"	Frankfort	"	20	"		½	"	8	"	Mud		
A. L. Granger	"	Joliet	"	20	"		1/4	"	3	"	Gravel		
Geo. Dobson, Sr.	Cerro Gordo	Cerro Gordo	Piatt	20	"		1/6	"	3½	"	Clay		
F. W. Warner	Roscoe	Roscoe	Winnebago	20	"		1/16	"	3	"	Hard pan		
E. Olds	Albany	Albany	Whiteside	20	"		1½	"	2½	"	Mud		
John C. Gunnden	Watseka	Watseka	Iroquois	60	"	3		"	3½	"	"		
A. A. Young	Yorkville	Yorkville	Kendall	20	"		⅛	"	3	"	"		
Wm. Borrow	Earlville	Earlville	LaSalle	20	"		⅛	"	3	"	"		
Martin Robst	Rock Grove	Rock City	Stephenson	20	"		½	"	3	"	"		
C. R. Gittings	Lomax	Terre Haute	Henderson	40	"		¼	"	5	"	Sod		
A. H. Baughman	Smithfield	Smithfield	Fulton	20	"		¾	"	3½	"	Mud		
D. W. Burroughs	Greenfield	Greenfield	Greene	20	"	23	¼	"	5	"	Clay		
A. Harrison	Dunlap	Dunlap	Peoria	20	"		½	"	3	"	Gravel		
Geo. E. Jenkins	Cutler	Cutler	Perry	20	"		½	"	3	"	Clay		
S. Crumption	Chatsworth	Chatsworth	Livingston	20	"	1		"	4½	"	Dirt		
W. W. Loudermilk	Auburn	Auburn	Sangamon	20	"		¾	"	4	"	Mud		

Name.	Post Office.	Express Office.	County.	No.	Date Shipm'nt	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
John Ruff	Carlyle	Carlyle	Clinton	20	Nov. 16	1½ acre	6 ft.	Sandy	
J. M. Ansley	Swedona	Swedona	Mercer	20	"	¼ "	4½ "	Blk. loam	
M. L. T. Sturgeon	Edgington	Edgington	Rock Island	20	"	½ "	5 "	Gravel	
S. H. Bradley	Mendon	Mendon	Adams	20	"	⅛ "	3½ "	Sand	
C. G. Clark	Carthage	Carthage	Hancock	20	"	¼ "	3 "	Clay	
J. W. Valentine	Carlinville	Carlinville	Macoupin	20	"	1 "	6 "	Mud	
Bernard Brambrink	Sigel	Sigel	Shelby	20	" 24	1 "	3½ "	"	
Azariah Bruce	Dix	Mt. Vernon	Jefferson	20	"	1 "	6 "	"	
W. H. Miller	Taylor Ridge	Milan	Rock Island	20	"	¾ "	4 "	Loam	
Chas. H. Eichs	Hyde Park	Chicago	Cook	20	" 30	"	7 "	Sand	Public water
Chas. Dorman	Shawneetown	Shawneetown	Gallatin	20	"	1 "	2 "	Clay	
Wm. Dorman	"	"	"	20	"	1 "	2 "	"	
Hy Wittmer	Summerfield	Summerfield	St. Clair	20	"	¼ "	7 "	"	
John Hafley	DuQuoin	DuQuoin	Perry	20	" 25	1 "	7 "	Mud	
J. M. Thompson	Joliet	Joliet	Will	20	"	1⅛ "	5 "	Clay	
E. M. Harris	Pinckneyville	Pinckneyville	Perry	20	"	1 "	3 "	"	
Geo. Fowler	Buda	Buda	Bureau	20	"	½ "	3 "	Mud	
E. C. Randall	Joliet	Joliet	Will	20	"	⅜ "	2 "	"	Crescent Stone Co.
F. W. Priest	Buffalo	Buffalo	Sangamon	20	"	½ "	5 "	Gravel	
Boyd Baldwin	Ellisville	Ellisville	Fulton	20	"	¼ "	3 "	Mud	
F. T. Finee	Sigel	Sigel	Shelby	20	"	⅛ "	4 "	"	
Jas. W. Arnold	Vernon	Vernon	Marion	20	"	½ "	5 "	Clay	
T. B. Rice	Medora	Medora	Macoupin	20	"	1 "	5 "	Sand	
J. M. Ansley	Swedona	Swedona	Mercer	40	"	¼ "	4½ "	Loam	To replace
Mrs. Mary Koelmel	Blue Mound	Blue Mound	Macon	20	"	1 "	4 "	Clay	
Sophia Koelmel	"	"	"	20	"	1 "	4 "	"	
Miss Mary Koelmel	"	"	"	20	"	1 "	4 "	"	
Genieve Koelmel	"	"	"	20	"	1 "	4 "	"	
John M. Evey	Secor	Secor	Woodford	20	"	1/16 "	5 "	"	
Amos T. Barker	Centralia	Centralia	Clinton	20	"	⅛ "	5 "	"	
W. C. Meyers	Tamaroa	Tamaroa	Perry	20	"	3½ "	8 "	Mud	
Ethen Trexler	Wheeler	Wheeler	Jasper	20	"	¾ "	5 "	Clay	
Jonathan Trexler	"	"	"	20	"	¾ "	7 "	"	
Wm. H. Wagner	Good Hope	Good Hope	McDonough	20	"	½ "	4½ "	Mud	
Jas. Stables	"	"	"	20	"	¼ "	5 "	Clay	
Jos. Bartman	Litchfield	Litchfield	Montgomery	20	"	¼ "	3½ "	"	
John Harbaugh	Madonnaville	Waterloo	Monroe	20	"		3½ "	Mud	
L. Parsons	Rosemond	Rosemond	Christian	20	"	½ acre	5 "	"	
A. P. Porter	Harmon	Harmon	Lee	20	"	40 "	5½ "	Loam	Public waters
C. J. Rosbrook	"	"	"	20	"	40 "	5½ "	"	" "
J. G. Beek, Jr.	Conant	Conant	Perry	20	Nov. 26	⅛ "	4 ft.	Clay	
C. C. Kenzdorfer	Fairfield	Fairfield	Wayne	20	" 27				
P. Taylor	Cane's Mills	Harrisburg	Saline	20	"	¼ acre	4½ ft.	Mud	

Geo. Schaffer	Bushnell	Bushnell	McDonough	20	Nov.	27	1½	acres.	5	ft.	Mud		
S. C. Slater	Watagua	Watagua	Knox	20	"		2	"	2½	"	"		
M. B. Slater	"	"	"	20	"		3	"	5½	"	"		
Harry Slater	"	"	"	20	"		2	"	2½	"	"		
R. L. Slater	"	"	"	20	"		1½	"	2½	"	"		
W. J. Lane	Decatur	Decatur	Macon	20	"		½	"	3½	"	Clay		
A. S. Slater	Watagua	Watagua	Knox	20	"		2	"	2½	"	Mud		
L. Porter	Channahon	Joliet	Will	20	"		4	"	5	"	"		
Curtis Morse	Lockport	"	"	20	"		¾	"	2½	"	"		
T. N. Hale	Long Branch	Raleigh	Saline	20	"		1	"	4	"	"		
Edw. Pelzer	Red Bud	Red Bud	Randolph	20	"		⅛	"	4½	"	"		
Chas Breideker	Columbia	Columbia	Monroe	20	"		¾	"	5	"	"		
Jno. M. Barthis	Clifton	Clifton	Iroquois	20	"		¾	"	4	"	"		
Geo. W. Pearce	Liberty	Quincy	Adams	20	"		¾	"	4	"	"		
Frederick Mills	"	"	"	20	"		¾	"	4	"	"		
S. E. Pearce	"	"	"	20	"		¾	"	4	"	"		
John Negeley	Wakefield	Olney	Richland	20	"		½	"	5½	"	Clay		
M. F. Trotter	Orangeville	Orangeville	Stephenson	20	"		½	"	2½	"	Sandy loam		
J. B. Steel	Niles	Morton	Cook	20	"		¼	"	7	"	Clay		
A. J. Martin	Belknap	Belknap	Johnson	20	"	28	¼	"	5	"	Mud		
Ezekiel Hunsinger	Liberty	Burnt Prairie	White	20	"		1	"	3½	"	"		
Jonas Larosh	Pekin	Pekin	Tazewell	20	"		½	"	3	"	Sand and loam		
Clark & Rook	Brimfield	Brimfield	Peoria	20	"		1½	"	10	"	Mud	Fed by springs	
Jno. D. Trimble	Trimble	Trimble	Crawford	20	"		¾	"	3	"	"		
G. L. Wineman	Richton	Richton	Cook	20	"		1	"	3½	"	Rocks	To replace	
Jas. P. McLean	Dongola	Dongola	Union	20	"		1	"	4	"	Clay		
Geo. B. Robinson	Mazon	Mazon	Grundy	20	"	29	¼	"	2½	"	Mud	Fed by springs	
Jno. Phillips	Xenia	Xenia	Clay	20	"	30	¼	"	5½	"	"		
Wm. A. Conant	Paw Paw	Paw Paw	Lee	20	"								
Hy. Timperly	Stewartson	Stewartson	Shelby	20	"		2	acres.	3	ft.	Sandy		
E. E. Spangler	Kaneville	Big Rock	Kane	20	"		1/20	"	3	"	Clay		
A. F. Spicer	Georgetown	Georgetown	Vermilion	20	"		¼	"	5	"	Sand		
Michael Rinier	Altona	Altona	Knox	20	"		½	"	4	"	Mud		
Jos. Friechtel	Sigel	Sigel	Shelby	20	"		¼	"	4	"	"		
R. W. McClaughry	Joliet	Joliet	Will	20	"		½	"	4	"	Rocks	On penitentiary grounds	
Gideon Murphy	Georgetown	Georgetown	Vermilion	20	"		¼	"	5	"	Gravel		
Andrew P. Anderson	Princeton	Princeton	Bureau	20	"		2	"	9	"	Mud		
Michael Body	Jacksonville	Jacksonville	Morgan	20	"		¼	"	5	"	Gravel		
Jos. Long	Marine	Marine	Madison	20	Dec.	1	¼	"	4	"	Mud		
J. W. Coghill	Roseville	Roseville	Warren	20	"		⅛	"	2½	"	"		
R. C. Pointer	Bardolph	Bardolph	McDonough	20	"		½	"	5	"	"		
Adolph W. Lund	Dalton	Dalton	Cook	20	"		⅛	"	10	"	Clay		
E. H. Casey	Ewing	Ewing	Franklin	20	"		½	"	5	"	"	Ewing College	
J. W. Grohs	Rochester	Rochester	Stark	20	"		2¼	"	5½	"	Sandy		
W. W. Gross	Elmore	Peoria	Peoria	20	"		¼	"	4	"	Mud		
Dan'l Sweeney	Tower Hill	Tower Hill	Shelby	20	"		¼	"	4½	"	"		
Tobe Koelmel	Blue Mound	Blue Mound	Macon	20	"		1	"	3	"	Clay		
Geo. D. Chaffee	Shelbyville	Shelbyville	Shelby	20	"		½	"	3	"	"		
Jno. P. Adams	Glasgow	Glasgow	Scott	20	"		½	"	3	"	Mud		
J. P. Jordan	Clay City	Clay City	Clay	20	"	2	1	"	4½	"	Clay		
Chas. Peter	Greenup	Greenup	Cumberland	20	"		⅛	"	6	"	"		
Wm. Rupke	Sigel	Sigel	Shelby	20	"		2	"	5	"	Mud		

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	Counties.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
Julius A. Briedecker	Columbia	Columbia	Monroe	20	Dec. 2	¾ acres.	6 ft.	Mud	
Peter N. Swanson	Victoria	Victoria	Knox	20	" 2	2 "	5 "	"	
F. W. Hensemann	Durham	Durham	Lewis	20	" 3	¾ "	4 "	"	Missouri.
Charley Peyton	Toronto (Vermillion co., Ind.)	Dana, Ill.	LaSalle	20	"	1 "	3 "	Gravel	
Jno. F. Spicer	Georgetown	Georgetown	Vermilion	20	"	½ "	5 "	"	
F. Rioth, Sr.	Mt Sterling	Mt. Sterling	Brown	20	"	½ "	9 "	Mud	
M. Rioth	"	"	"	20	"	½ "	8 "	"	
W. F. Rioth	Mounds	Mounds	"	20	"	½ "	7 "	"	
Wm. Croin	Mt. Sterling	Mt. Sterling	"	20	"	½ "	6 "	"	
M. Sullivan	Siloam Springs	Clayton	Adams	20	"	½ "	7 "	"	
E. B. Merriweather	Shipman	Shipman	Macoupin	20	"	¼ "	6 "	Clay	
A. Horrocks	Bardolph	Bardolph	McDonough	20	"	½ "	6 "	Mud	
S. J. Park	"	"	"	20	"	½ "	6 "	"	
Saml. Statler	Good Hope	Good Hope	"	20	"	½ "	5 "	Clay	
M. McEnglee	Mt. Sterling	Mt. Sterling	Brown	20	"	1 "	5 "	"	
Jno. Wisenstein	Columbia	Columbia	Monroe	20	"	¾ "	5 "	Mud	
M. Waite	Reynolds	Reynolds	Mercer	20	"	1½ "	5 "	"	
Jno. W. Curl	DeWitt	DeWitt	DeWitt	20	"	1 "	3 "	"	
Asa McDaniel	Paris	Paris	Edgar	20	"	1 "	3 "	Boggy	
Jno. Kapp	Lake Creek	Lake Creek	Williamson	20	"	¾ "	5 "	Mud	
A. L. Maxwell	Flat Rock	Flat Rock	Crawford	20	"	½ "	4 "	Clay	
Jos. Mertel	Utica	Vermillionville	LaSalle	20	"	½ "	7 "	Sand	
D. Schrene	Summerfield	Summerfield	St. Clair	20	"	½ "	6 "	Mud	
L. N. Ashley	Gibson City	Gibson City	Ford	20	"			"	
J. F. Opel	Carpenter	Carpenter	Madison	20	"	1 acre	8 ft.	Clay	
A. W. Bube	Joliet	New Lenox	Will	20	"		2 "	Mud	Public water.
Jno. R. McCammond	Rockford	Rockford	Winnebago	20	"	½ acre	6 "	Clay	
H. F. Pinnell	Kansas	Kansas	Edgar	20	"	¾ "	3 "	Mud	2d lot to replace.
C. R. Shannon	Industry	Industry	McDonough	20	"	¼ "	6 "	"	
R. E. Cochrane	Knoxville	Knoxville	Knox	20	"	⅛ "	2½ "	Clay	
Ezra Kearney	Flora	Flora	Clay	20	"	⅛ "	3 "	Mud	
J. P. McKibbon	Flat Rock	Heathville	Crawford	20	"	¼ "	3 "	Clay	
Jas. McKibbon	"	"	"	20	"	½ "	4 "	"	
Alex Delzill	"	"	"	20	"	¼ "	3½ "	"	
C. A. Bilinski	Diamond Lake	Liberty Hill	Lake	60	"	400 "	33 "	Mud	Public water
James Hoffman	Viola	Viola	Mercer	20	" 5	⅛ "	3 "	"	
E. Closenburg	"	"	"	20	"	⅛ "	3 "	"	
T. H. Howell	Cisco	Cisco	Piatt	20	"	⅛ "	2 "	"	Pond, Macon co. n. Cisco
Boyd Baldwin	Ellisville	Prairie City	Fulton	20	" 6	¾ "	3 "	"	
J. C. Layman	Benton	Benton	Franklin	20	"	1 "	3 "	Clay	
C. M. Wise	Sycamore	Sycamore	DeKalb	20	"	1 "	4½ "	"	
A. F. Davis	Ridgefield	Ridgefield	McHenry	20	" 7	6 "	4 "	Mud	

H. A. Riner	Mason City	Mason City	Mason	20	Dec.	8	4	acre	3	ft.	Mud		
D. W. Riner	"	"	"	20	"		4	"	3	"	"		
M. E. Donglass	Elgin	Elgin	Kane	20	"		2	"	4	"	"		
Geo. W. Cellinger	Alexis	Alexis	Warren	20	"		1/2	"	5	"	"		
James Hanke	Trenton	Trenton	Clinton	60	"	3		"	6	"	Clay		
D. F. Beauman	Vienna	Tunnel Hill	Johnson	20	"		1/4	"	5	"	"		
Geo. Waight	Alexis	Alexis	Warren	20	"	10	2 1/2	"	7	"	Mud		
Jesse Baldwin	Joliet	Joliet	Will	20	"	11	1/10	"	2	"	"		
L. E. Meadows	Abingdon	Abingdon	Knox	20	"		1/4	"	3	"	Clay	Fed by springs	
Geo. W. Mansfield	Hillsboro	Hillsboro	Montgomery	20	"	13	1/2	"	6	"	"		
Mahlen Yoder	Arthur	Arthur	Moultrie	20	"		1/4	"	14	"	"		
Henry Johnson	Kelly	Ionia	Warren	20	"		1/2	"	10	"	Mud		
George L. Riess	Red Bud	Red Bud	Randolph	20	"		1/4	"	5	"	"		
George Turner	Kelly	Ionia	Warren	20	"	14	1 1/2	"	10	"	"		
John W. Springer	Jacksonville	Orleans	Morgan	20	"		1 1/2	"	3	"	Clay		
Alex. Johnson	Kelly	Ionia	Warren	20	"		1 1/2	"	8	"	Mud		
Geo. H. Damon	Paw Paw	Paw Paw	Lee	20	"		1/4	"	3	"	"		
Fergus Lloyd	Malta	Malta	DeKalb	20	"		2	"	2	"	"		
John H. Wear	Winchester	Winchester	Scott	20	"		1/4	"	3	"	"		
Daniel Hitchcock	Princeville	Princeville	Peoria	20	"	15	1	"	5	"	"		
Robert B. Wilson	Moawequa	Moawequa	Shelby	20	"		1/2	"	2	"	Clay		
James Thompson	Blyton	Ellisville	Fulton	20	"		3/4	"	4	"	Grass		
James Leighton	Oneida	Oneida	Knox	20	"		3/4	"	4 1/2	"	Mud		
John A. Leighton	"	"	"	20	"		3/4	"	4 1/2	"	"		
Lewis Leighton	"	"	"	20	"		3/4	"	4 1/2	"	"		
James Leighton	"	"	"	20	"		3/4	"	4 1/2	"	"		
M. J. Brant	"	"	"	20	"		3/4	"	4 1/2	"	"		
J. F. Self	Jacksonville	Jacksonville	Morgan	20	"	16	1	"	5	"	Gravel and clay		
A. J. Clark	Scotland	Scotland	Edgar	20	"		1/4	"	5	"	Mud		
John T. Steele	Wine Hill	Welge	Randolph	20	"		1/8	"	4	"	"		
Daniel Estel, Jr	Columbus	Coatsburg	Adams	20	"		1/2	"	4	"	Clay		
Albert Estel	"	"	"	20	"		1/2	"	4	"	"		
George Estel	"	"	"	20	"		1/2	"	4	"	"		
John Estel	"	"	"	20	"		1/2	"	4	"	"		
Fred Estel	"	"	"	20	"		1/2	"	4	"	"		
Ezra Bear	Dixon	Dixon	Lee	20	"		1/16	"	4	"	"		
Warren Towsley	Rinard	Rinard	Wayne	20	"		1/4	"	3	"	Mud		
John A. Paige	Steward	Steward	Lee	20	"		1/2	"	1 1/2	"	"		
R. P. Anderson	Iola	Iola	Clay	20	"	19	1/8	"	1 1/2	"	"		
Eliza E. Owen	Ames	Red Bud	Monroe	20	"		1/8	"	1 1/2	"	"		
F. M. Grimes	Milton	Pittsfield	Pike	20	"		1/4	"	2 1/2	"	Clay		
Jno. Hodges	Unity	Cairo	Alexander	100	"	a	creek in	Alexa	under	county	Public water		
E. N. French	Milton	Milton	Pike	20	"		1/4	acre	3 1/2	ft.	Clay		
P. C. Peebles	Chesterfield	Chesterfield	Macoupin	20	"		1/4	"	3	"	Mud		
Harry Combs	Petersburg	Petersburg	Menard	20	"		1/8	"	3 1/2	"	"		
Chas. H. Osgood	Wataga	Wataga	Knox	20	"	28	1/2	"	6	"	"		
Mrs. Jessie P. Osgood	"	"	"	20	"		1/2	"	6	"	"		
W. O. Willard	Coleta	Coleta	Carroll	20	"		1/2	"	3	"	"		
W. F. Bishop	Towanda	Towanda	McLean	20	"	31	1/4	"	2	"	"		
J. J. Baldwin	Neoga	Neoga	Cumberland	20	"		1 1/4	"	4	"	"		

Name.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
					1886				
C. E. Blankinship	Patoka	Patoka	Marion	20	Jan. 1	½ acre	3½ ft.	Mud	
Thos. Cope	Danville	Danville	Vermilion	20	" 6				
A. Atherton	Pleasant Plains	Pleasant Plains	Sangamon	20	"	2 acre	4 ft.	Loam	
Christ Soos, Jr.	Centralia	Central City	Marion	20	" 7	¾ "	2½ "	Mud	
Elizabeth Elbert	Sannemin	Sannemin	Livingston	20	"	⅛ "	2½ "	Clay	
Samuel Elbert	"	"	"	20	"	1/9 "	2½ "	"	
Emma Tretter	Orangeville	Orangeville	Stephenson	20	" 10	⅛ "	2½ "	Loam	
Otto Gehrig	Alhambra	Alhambra	Madison	20	" 12	⅛ "	5 "	Clay	
Jno. Gehrig	"	"	"	20	"	1/16 "	3 "	"	
Sam Gehrig	"	"	"	20	"	1/16 "	3 "	"	
Cornelius Drake	Grove City	Grove City	Christian	20	" 14	⅛ "	2½ "	Mud	
C. Cramborg, Jr.	Adrain	Adrain	Hancock	20	" 15	¼ "	2 "	"	
Wm. Ritchie	Warrensburg	Warrensburg	Macon	20	"	¼ "	5 "	"	
F. A. Bishop	Towanda	Towanda	McLean	20	"	½ "	4 "	"	
R. Waldin	Quincy	Quincy	Adams	20	" 18	4 "	4 "	"	
C. Waldin	"	"	"	20	"	4 "	4 "	"	
Louise Waldin	"	"	"	20	"	4 "	4 "	"	
A. Waldin	"	"	"	20	"	4 "	4 "	"	
Eddie Waldin	"	"	"	20	"	4 "	4 "	"	
Robt. Waldin	"	"	"	20	"	4 "	4 "	"	
Chas. T. Strattan	Mt. Vernon	Mt. Vernon	Jefferson	40	"	⅛ "	5 "	"	
Geo. F. Soos	Central City	Centralia	Marion	20	" 19	¾ "	3 "	"	
D. D. Bishop	Towanda	Towanda	McLean	20	"	½ "	4 "	"	
A. H. Collins	"	"	"	20	"	½ "	4 "	"	
Maria Lammers	Ohlman	Ohlman	Christian	20	"	¼ "	4 "	"	
Herman Lammers	"	"	"	20	"	¼ "	4 "	"	
Jno. Whiteford	Manito	Manito	Mason	20	" 20	⅛ "	5 "	"	
Wm. Bertschi	Appanoose	Appanoose	Hancock	20	"	⅛ "	5 "	"	
F. Marcy	Springfield	Springfield	Sangamon	20	" 21	1½ "	5½ "	"	
A. Butler	"	"	"	20	"	1½ "	5½ "	"	
Geo. P. Loose	"	"	"	20	"	1½ "	5½ "	"	
J. L. Price	"	"	"	20	"	1½ "	5½ "	"	
E. M. Loose	"	"	"	20	"	1½ "	5½ "	"	
C. S. Stanfield	Edgar	Edgar	Edgar	20	" 28	1 "	3½ "	"	
Caleb Stanfield	"	"	"	20	"	1 "	3½ "	"	
A. L. Stanfield	"	"	"	20	"	1 "	3½ "	"	
Josephus Stanfield	"	"	"	20	"	1 "	3½ "	"	
Jno. Clapp	Taylor Ridge	Taylor Ridge	Rock Island	20	"	⅛ "	4 "	"	
S. T. Webber	Eldorado	Eldorado	Saline	20	" 29	⅛ "	6 "	Clay	
C. M. Mitchell	"	"	"	20	"	⅛ "	6 "	"	
P. A. Hickman	Mt. Sterling	Mt. Sterling	Brown	20	"	½ "	3 "	"	
L. Hickman	"	"	"	20	"	½ "	3 "	"	
J. W. Coppage	"	"	"	20	"	½ "	3 "	"	
A. Putman	"	"	"	20	"	½ "	3 "	"	

D. Harley	Sandoval	Sandoval	Marion	20	Jan.	20					Frozen in transit
Jos. Clark	New Philadelphia	New Philadelphia	Fulton	20	"		¼	acre.	1	ft. Clay	
Jno. F. Smith	Geneseo	Geneseo	Henry	20	"		1½	"	4	" Mud	
Wm. Galle	Morissa	Morissa	St. Clair	20	Feb.	11	¼	"	5	" "	
Ira Arnold	Industry	Macomb	McDonough	20	"	13	½	"	4	" Sand	
A. Brubaker	Morrison	Morrison	Whiteside	20	"	15	2	"	2½	Mud	Frozen in transit
H. Birkshro	Chauncey	Sumner	Lawrence	20	"						All dead on arrival
Jackson Sells	Bloomington	Bloomington	McLean	20	Jan.	28					
H. Gross	Atwood	Atwood	Douglas	20	"						
Jas. H. Scott	Eldorado	Eldorado	Saline	20	"						
Cornelius Drake	Grove City	Grove City	Christian	20	"						
H. H. Drake	"	"	"	20	"						
G. Drake	"	"	"	20	"						
Irwin Drake	"	"	"	20	"						
Emma Drake	"	"	"	20	"						
Wm. M. Dews	Deland	Deland	Piatt	20	"						
Jno. W. Greening	Loami	Loami	Sangamon	20	"						
E. D. Kemp	Sheffield	Sheffield	Bureau	20	"		1	acre.	4	ft. Mud	
Mrs. E. D. Kemp	"	"	"	20	"		1	"	4	" "	
J. D. Dobson	Wataga	Wataga	Knox	20	"						
Sam'l. Tindall	Jacksonville	Jacksonville	Morgan	20	"						
Jno. Carter	"	"	"	20	"						
P. D. Richardson	"	"	"	20	"						
David Redpath	Marengo	Marengo	McHenry	20	"						
Horatio Osgood	Wataga	Wataga	Knox	20	"						
Mrs. H. Osgood	"	"	"	20	"						
Jas. K. Baughman	Blandinsville	Blandinsville	McDonough	20	"						
Mrs. K. Baughman	"	"	"	20	"						
H. Berkshire	Chauncey	Chauncey	Lawrence	20	Feb.	20					To replace
Jos. Dayhoff	Brownstown	Brownstown	Fayette	20	"						
Joe L. Savor	Maroa	Maroa	Macon	20	"						
J. F. Hight	Samoth	Vienna	Johnson	20	"						
A. Burkaker	Morrison	Morrison	Whiteside	20	"						To replace
M. C. Fisher	Sumner	Sumner	Lawrence	20	"						
L. B. Osgood	Bentley	Bentley	Hancock	20	"						
A. J. Mapes	Scottland	Scottland	Edgar								
A. A. Newlan	Cherry Point	Cherry Point	"								
D. A. Fouts	Christian	Christian	"								
W. C. Duker	"	"	"								
W. B. Tribba	Albia, Ia	Albia, Ia	Edwards								
Geo. Stortzum	Montrose	Montrose	Effingham								
Wm. Blakely	Altamont	Altamont	"								
Dr. S. S. Rice	"	"	"								
Geo. J. Zander	"	"	"								
John Albert	Steeleville	Steeleville	Randolph								
J. L. Lively	Perry	Perry	"								
J. M. Lively	"	"	"								
M. Hawson	"	"	"								

Carp Distribution—Continued.

NAME.	Post Office.	Express Office.	County.	No.	Date Ship'ent.	Area of Water.	Av. Depth.	Character of Bottom.	Remarks
Wm. F. Allevert	Welga	Welga	Randolph						
Dr. J. Keeler	Steeleville	Steeleville	"						
E. H. Norwood	Olney	Olney	Richland						
A. J. Farus	"	"	"						
D. S. Curvey	Calhoun	Calhoun	Richland						
A. T. Baird	Olney	Olney	"						
Edward Silk	Exeter	Exeter	Scott						
Mrs. Sue J. Vickery	Jacksonville	Jacksonville	Morgan						
R. W. Gillam	Chillicothe	Chillicothe	Peoria						
S. D. Kemp	Elmwood	Elmwood	"						
J. W. Ellie	DuQuoin	DuQuoin	Perry						
Thos. White	Cutler	Cutler	"						
W. F. Tetto	Conant	Conant	"						
Geo. Ramhilt	Cutler	Cutler	"						
Wm. C. Davis	"	"	"						
John Ott	Camden	Camden	Schuyler						
W. L. Dove	Shelbyville	Shelbyville	Shelby						
O. Wilhelms	Florence Station	Florence Station	Stephenson						
W. Wilhelms	"	"	"						
John Gardner	Potomac	Potomac	Vermilion						
Hy Bowers	East Lynn	East Lynn	"						
A. J. Stephenson	Ridge Farm	Ridge Farm	"						
J. J. Frontt	Nashville	Nashville	Washington						
Edgar King	Enfield	Enfield	White						
R. A. Cowdy	"	"	"						
J. F. Bowman	Brownstown	Brownstown	Fayette						
A. W. Wing	Vandalia	Vandalia	"						
J. C. Bowles	Hagerstown	Hagerstown	"						
E. Smith	Vandalia	Vandalia	"						
Disken Proyer	Farmington	Farmington	"						
W. F. Moder	Gibson City	Gibson City	Ford						
R. G. Webb	Taylor Hill	Taylor Hill	Franklin						
W. O. Morgan	Cuba	Cuba	Fulton						
J. E. Sandusky	Flint	Flint	Hamilton						
Z. S. Young	West Liberty	West Liberty	Jasper						
O. A. Wilbank	Belle Rive	Belle Rive	Jefferson						
Dr. O. P. Morris	Ashler	Ashler	Washington						
J. T. Payson	Wood Lawn	Wood Lawn	"						
A. D. Gross	Greenville	Greenville	Bond						
C. Ketterman	Tiskilwa	Tiskilwa	Bureau						
A. O. Elliott	Homer	Homer	Champaign						

C. C. Stevens	Homer	Homer	Champaign
J. W. Reed	"	"	"
J. F. White	Pana	Pana	Christian
Wm. M. Mossey	Xenia	Xenia	Clay
T. O. Pence	"	"	"
G. W. Hiatt	Neoga	Neoga	Cumberland
D. A. Ware	Camargo	Camargo	Douglas
John McKee	Chrisman	Chrisman	Edgar
B. G. Roots	Tamaroa	Tamaroa	Perry
J. C. Kinzey	"	"	"
George Baird	Pinckneyville	Pinckneyville	"
E. H. Lenen	"	"	"
M. P. Genen	"	"	"
J. L. Murphy	"	"	"
Marion Wright	St. John	St. John	"
Wm. E. Brokings	DuQuoin	DuQuoin	"
Fritz Drier	Steeleville	Steeleville	Randolph
D Scheck	"	"	"
J. Hagehorn	Evansville	Evansville	"
Thos. D. Carlton	Vienna	Vienna	Johnson
H. B. Douglas	Aurora	Aurora	Kane
C. P. Skinner	Manteno	Manteno	Kankakee
C. R. Hodge	Momence	Momence	"
J. E. Reigler	Millbrook	Millbrook	Kendall
R. B. Kane	Earlville	Earlville	LaSalle
W. E. Dole	"	"	"
L. H. Davis	"	"	"
P. A. Moray	"	"	"
Jas. Cochran	Pinkstaff	Pinkstaff	"
F. Brian	Summer	Summer	Lawrence
J. C. Cunningham	"	"	"
Wm. M. Goble	LaClair	LaClair	DeKalb
Capt. J. M. Dysart	Dixon	Dixon	Lee
J. M. Boyd	Atlanta	Atlanta	Logan
G. Howcocks	Bardolph	Bardolph	McDonough
T. M. Cover	Macomb	Macomb	"
H. Cline	"	"	"
Geo. A. Cover	"	"	"
A. B. Stickle	"	"	"
Wm. Waggoner	Good Hope	Good Hope	"
E. E. Turner	Woodstock	Woodstock	McHenry
Wm. B. Hewitt	Chenoa	Chenoa	McLean
Fred. K. Spaunth	Carpenter	Carpenter	Madison
Nicholas Lernas	North Alton	North Alton	"
C. J. Tobey	Vernon	Vernon	Marion
Sam'l J. Hatch	"	"	"
C. M. Hamilton	Salem	Salem	"
Henry Menerly	Kinmundy	Kinmundy	"

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.	Date Shipm't	Area of Water.	Av. Depth.	Character of Bottom.	Remarks.
J. J. Morris	Marlow	Marlow	Jefferson	20	Dec. 15				
F. M. Newman	Ashley	Ashley	Washington	20	"				
Emig & Dugger	Trenton	Trenton	Clinton	20	"				
Hamilton & Parkhill	Shiloh Hill	Shiloh Hill	Randolph	20	"				
M. M. Rendeman	Jonesboro	Jonesboro	Union	20	"				
J. S. Hickman	East Lynn	East Lynn	Vermilion	20	"				
S. H. Diehman	Princeton	Princeton	Bureau	20	"				
Jas. Given	"	"	"	20	"				
Amos Meyer	Montrose	Montrose	Effingham	20	"				

Carp Distributed by U. S. Fish Commission Direct—From Car No. 3, J. Frank Ellis, Superintendent—from Quincy, Ill.

Name.	Post Office.	Express Office.	County.	No.
Mrs. L. S. Harris	Greenville	Greenville	Bond	50
F. Rioth	Mt. Sterling	Mt. Sterling	Brown	50
E. K. Kemp	Sheffield	Sheffield	Bureau	50
David A. Jones	Wyanet	Pond Creek	"	50
S. P. Clark	Dover	Malden	"	50
Andrew Hettinger	Belvidere	Belvidere	Boone	50
B. Cornwell	Capron	Capron	"	50
F. G. McNutt	Shannon	Shannon	Carroll	50
D. T. Weed	Lanark	Lanark	"	50
S. J. Bartlett	Beardstown	Beardstown	Cass	50
Chas. T. Lewes	Fisher	Fisher	Champaign	50
Michael Walsh	Philo	Philo	"	50
G. W. B. Sadorus	Sadorus	Sadorus	"	50
W. D. Powers	Philo	Philo	"	50
Edward E. Gulick	Mahomet	Mahomet	"	50
Alvah Craw	Sadorus	Sadorus	"	50
Josiah Graham	Homer	Homer	"	50
B. E. Warner	Rosemond	Rosemond	Christian	50
Joseph Fitzpatrick	Pana	Pana	"	50
William A. Weber	"	"	"	50
N. B. Chalford	"	"	"	50
James Madison	Marshall	Marshall	Clark	50
E. C. Madison	"	"	"	50
J. Q. Snedeker	McKeen	Dennison	"	50
Charles H. Byrne	Hoosier Prairie	Louisville	Clay	50
Joseph Crackel	Sailors' Springs	Clay City	"	50
Johnson Kincaid	Hord	Mason	"	50
Stephen Kincaid	"	"	"	50
A. T. Detweisler	Louisville	Louisville	"	50
David D. Weaver	"	"	"	50
John F. Weaver	Ashmore	Ashmore	Coles	50
Sarah Moore	Clara	Clara	"	50
Sylvester Halbrook	Oakland	Oakland	"	50
George J. Walker	Coles	Coles	"	50
J. W. Hogue	Mattoon	Mattoon	"	50
A. C. Hesing	Chicago	Oak Park	Cook	50
T. H. Bryant	"	Elgin	"	50
Lincoln Ice Co	"	Burlington, Wis	"	50
Edward Beeman	Robinson	Robinson	Crawford	50
W. T. Beeman	"	"	"	50
Israel Miller	"	"	"	50
W. H. O. Stevens	Shabbona	Shabbona	DeKalb	50
Geo. Brewer	Sandwich	Sandwich	"	50
Thomas Moran	Neoga	Neoga	Cumberland	50
John T. Kinney	"	"	"	50
Capt. T. C. Wellman	"	"	"	50
Geo. A. Dove	Parnell	Parnell	DeWitt	50
Robert Emery	Solomon	DeWitt	"	50
Ewen & Snyder	Arcola	Arcola	Douglas	50
Henry D. Netzly	Naperville	Naperville	DuPage	50
Hon. C. Beckwith	Chicago	Hinsdale	"	50
A. L. Sostwell	Brocton	Brocton	Edgar	50
Michael Smith	Hume	Hume	"	50
William Avery	Paris	Paris	"	50
Judson Gould	Bone Gap	Bone Gap	Edwards	50
Geo. Skeavington	Albion	Albion	"	50
Wm. Wolff	West Salem	West Salem	"	50
Geo. Strong	Eberle	Watson	Effingham	50
Dudley M. Stevens	Montrose	Montrose	"	50
Geo. S. Elliott	Watson	Watson	"	50
David Sweazy	Beecher City	Beecher City	"	50
Louis Zeigler, Sr	Blue Point	Altamont	"	50
Rob't Young	"	"	"	50

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.
Dennis Hopper	Farina	Farina	Fayette	
Willard Keisling	Brownstown	Brownstown	"	
Caleb Johnson	Farina	Farina	"	
Sebastian Wolf	"	"	"	
Henry Mettler	St. Elmo	St. Elmo	"	
James May Croft	"	"	"	
Nels. Sunnes	Elliott	Elliott	Ford	
Isaac N. Simpson	Benton	Benton	Franklin	
J. E. Wharry	Thompsonville	Thompsonville	"	
Dallas Biggs	"	"	"	
R. Wharry	"	"	"	
Amos Gallant	Lewistown	Lewistown	Fulton	
Wm. S. Murphy	Cuba	Cuba	"	
Milton Murphy	"	"	"	
John Irwin	"	"	"	
Garrett Ackerson	Smithfield	Smithfield	"	
M. Nead Bear	Farmington	Farmington	"	
David Cowman	London Mills	London Mills	"	
John V. Mercer	Vermont	Vermont	"	
James Lindsey	Ipava	Ipava	"	
Rob't R. Steck	Farmington	Farmington	"	
A. J. Page	Canton	Canton	"	
Cyrus Cucher	Astoria	Astoria	"	
John Groves	"	"	"	
Richard Gill	Shawneetown	Shawneetown	Gallatin	
Stephen Wathen	Ridgway	Ridgway	"	
Granville Shaffer	Macedonia	McLeansboro	Hamilton	
Nathan Garrison	Dahlgren	Dahlgren	"	
W. D. Porter	"	"	"	
Thos. A. McPherson	"	"	"	
Hiram Peer	Ellis Mound	Wayne City	"	
Simon T. Callihan	Fountain Green	Colchester	Hancock	
Mrs. Martha O. Walton	Plymouth	Plymouth	"	
Jerry Hegler	Rosiclare	Rosiclare	Hardin	
Anton Hermann	"	"	"	
P. J. Howard	"	"	"	
Wm. Woods	"	"	"	
H. London	"	"	"	
Sam'l Steele	"	"	"	
W. A. Durham	Karber's Ridge	Elizabethtown	"	
Peter J. Wickblom	Bishop Hill	Bishop Hill	Henry	
J. G. Weidlein	Morristown	Osco	"	
Wm. L. Robinson	Genesee	Genesee	"	
P. L. Johnson	Bishop Hill	Bishop Hill	"	
Mrs. E. E. Stafford	Colona	Colona	"	
T. G. Morris	LaHogue	LaHogue	Iroquois	
J. S. Williams	Woodland	Woodland	"	
Orrin W. Pentzer	"	"	"	
L. L. Pittser	LaHogue	LaHogue	"	
Sam'l M. Hawk	Murphysboro	Murphysboro	Jackson	
John H. Burkhalter	DeSoto	DeSoto	"	
E. D. Jenkins	Opdyke	Opdyke	Jefferson	
A. J. Fitzgerrell, M. D	Fitzgerell	Tamaroa	"	
Josiah Willis	"	"	"	
Walter Gummow	Scales' Mound	Scales' Mound	JoDaviess	
Wm. H. Thomas	Sanburn	Tunnel Hill	Johnson	
Lee Chapman	Vienna	Vienna	"	
James Rathbone	Geneva	Geneva	Kane	
Edwin E. Thompson	Elgin	Elgin	"	
E. Laswell	Salem	Odin	Kankakee	
Frank VanDoozer	Plano	Plano	Kendall	
James H. Victor	Rio	Rio	Knox	
Geo. Blakely	Rapatie	Wallace	"	
Samuel Burris	Waukegan	Waukegan	Lake	
Mrs. A. Trotter	Milburn	Wadsworth	"	
Wm. Stoffel	Volo	McHenry	"	
A. S. Chandler	Gurnee	Waukegan	"	
R. J. Roberson	Ransom	Ransom	LaSalle	
Chauncey J. McDade	Streator	Streator	"	
A. E. Brunson	Northville	Somonauk	"	
Jeremiah Wood	Ottawa	Ottawa	"	
Perry Lewis	Bridgeport	Bridgeport	Lawrence	
Jacob Fisher	Steward	Steward	Lee	
D. C. Miller	Early Dawn	Compton	"	
Wm. Dunkelberger	Steward	Steward	"	
D. L. Doan	Amboy	Amboy	"	
Pete Swisher	"	"	"	
Edward R. Francis	Forest	Forest	Livingston	
V. Augstin	Flanagan	Flanagan	"	

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.
John G. Herzog	Blandinsville	Blandinsville	McDonough	20
Geo. W. Solomon	New Philadelphia	New Philadelphia	"	20
J. L. Harden	Good Hope	Good Hope	"	20
Kate Harden	"	"	"	20
Joseph Cope	"	"	"	20
Cary Howell	Greenwood	Woodstock	McHenry	20
P. H. Kennedy	Harvard	Harvard Junction	"	20
G. W. Palmer	Heyworth	Heyworth	McLean	20
T. H. Hill	"	"	"	20
Silas Robinson	Saybrook	Saybrook	"	20
M. Tambling	Normal	Normal	"	20
F. M. Emerson	Bloomington	Bloomington	"	20
Phoenix & Emerson	"	"	"	20
John Feucht	"	"	"	20
A. J. Mathews	Troy	Troy	Madison	20
A. S. Joseph	Dorsey	Dorsey	"	20
R. E. Wilson	"	"	"	20
C. P. Smith	Edwardsville	Edwardsville	"	20
Owen Marford	Sandoval	Sandoval	Marion	20
Silas Mercer	Raccoon	Raccoon	"	20
J. F. Hight	Samath	Vienna	Massac	20
Hiram W. Belknap	Nokomis	Nokomis	Montgomery	20
Chas. J. Drury	Orleans	Orleans	Morgan	20
Frank D. Healey	Polo	Polo	Ogle	20
Harvey Shoemaker	Eagle Point	"	"	20
J. N. Shoemaker	"	"	"	20
W. M. Dudley, Sr.	Tamaroa	Tamaroa	Perry	20
Rook & Clark	Brimfield	Brimfield	Peoria	20
Fred. Weber	Peoria	Fairbury	"	20
Edgar A. McCurdy	"	Peoria	"	20
Phillip A. Moffitt	Chillicothe	Chillicothe	"	20
S. E. Adams	Peoria	Peoria	"	20
J. A. Welsh	"	"	"	20
S. E. Adams	"	"	"	*6
J. A. Welsh	"	"	"	*6
J. E. Andrews	Cisco	Cisco	"	*6
S. G. Kendrick	ElDara	Barry	Pike	20
E. M. Low	Pulaski	Pulaski	Pulaski	20
H. C. Tearnsick	Villa Ridge	Villa Ridge	"	20
Samuel H. Johnson	America	America	"	20
James H. Crain	Junction	Junction	"	20
Benj. Sutcliffe	Hennepin	Bureau Junction	Putnam	20
Wm. Steiger	Red Bud	Red Bud	Randolph	20
Dr. A. B. Beattie	"	"	"	20
Josiah E. Taylor	Claremont	Claremont	Richland	20
Mollie Murphy	ElDorado	ElDorado	Saline	20
John L. Ridgway	Stone Fort	Stone Fort	"	20
Dan. Firk	Pleasant Plains	Pleasant Plains	Sangamon	20
B. T. Irwin	"	"	"	20
James A. Stone	Bradfordton	Brodfordton	"	20
Richard Southwell	Winchester	Winchester	Scott	20
John H. Weare	"	"	"	20
Wm. Reighley	Moweaqua	Moweaqua	Shelby	20
S. K. Croco	Oconee	Oconee	"	20
L. Headley	Lakewood	Lakewood	"	20
Russell Middleton	Tower Hill	Tower Hill	"	20
J. Demuth	Toulon	Toulon	Stark	20
Horatio Jones	Lena	Lena	Stephenson	20
Israel Miller	McConnell	"	"	20
Harman Ploeger	Yellow Creek	Freeport	"	20
David Bloomer	Fairmount	Fairmount	Vermilion	20
Jacob H. Oakwood	Catlin	Catlin	"	20
Robert Buchanan	Bellmont	Bellmont	Wabash	20
W. H. McQuiston	Monmouth	Monmouth	Warren	20
John Schuchmann	Dubois	Dubois	Washington	20
S. L. Coulter	Oakdale	Coulterville	"	20
Harmon Seiling	Elk Horn	Nashville	"	20
John Lowe	Johnsonville	Johnsonville	Wayne	20
Henry D. Hatch	Lockport	Lockport	Will	20
M. Collins	Peotone	Peotone	"	20
Stephen Eyrich	"	"	"	20
Fred Hanert	"	"	"	20
H. A. Shiffer	Joliet	Joliet	"	20
Jacob Lutz	Manhattan	Manhattan	"	20
Fred'k Collins	Lockport	Lockport	"	20
Thomas Gildseth	Durand	Durand	Winnebago	20
John Teague	Rockford	Rockford	"	20

*Gold fish.

Carp Distribution—Continued.

Name.	Post Office.	Express Office.	County.	No.
Wm. A. Connelly	Enfield	Enfield	White	20
Dan'l Hanagan	"	"	"	20
Wm. Oliver	Norris City	Norris City	"	20
J. C. Upton	Springerton	Springerton	"	20
A. C. Taylor	"	"	"	20
D. W. Reynolds	Hopkins	Galt	Whiteside	20
Marcus R. Lyon	Prophetstown	Prophetstown	"	20
D. A Hawk	Albany	Erie	"	20

List of Applicants on File in Office up to Sept. 30, to be Supplied at Next Distribution.

Name.	Post Office.	County.	No.
Jackson Potter	Liberty	Adams	20
Jas. H. Dallas	Harrisburg	Saline	20
B. L. Frink	Neelyville	Morgan	20
Will A. Allen	Westfield	Clark	20
Aug. Chenot	Belleville	St. Clair	20
John H. Upton	McLeansboro	Hamilton	20
David Upton	"	"	20
Geo. A. Zeller	Spring Bay	Peoria	20
John Weisenberger	Liberty	Adams	20
Joseph G. Nelson	Morris	Grundy	20
Samuel Sweeney	Tower Hill	Shelby	20
Edward Sweeney	"	"	20
Henry Temperly	Stuardson	"	20
Mrs. Addie Mellett	McLeansboro	Hamilton	20
H. S. Clark	Mattoon	Coles	20
J. T. Ewing	"	"	20
Jasper Miller	"	"	20
J. B. Hogan	"	"	20
Mrs. M. Dyslin	Lanark	Carroll	20
Frank Ames	Red Bud	Randolph	20
Griggenbucher Milling Co	St. Jacobs	Madison	20
Cyrus Johnson	Payson	Adams	20
Mrs. Cyrus Johnson	"	"	20
Henry F. Rutmeir	Forreston	Ogle	20
V. M. Twitchell	Morrison	Whiteside	20
Wm. Pleglen	Red Bud	Randolph	20
Henry Mudd	"	"	20
H. N. Webb	Tunnel Hill	Johnson	20
H. A. Simpson	Pana	Christian	20
J. T. Garrett	Bruce	Moultrie	20
Ralph Garrett	"	"	20
Dr. Theo. Hudson	Marion	Williamson	20
E. L. Grosh	Lorance	Adams	20
T. H. Bryant	Chicago	Cook	20
John Olsen	Mendon	Adams	20
E. B. Crosby	Viola	Mercer	20
J. E. Russell	"	"	20
Chas. Nix	Ingraham	Clay	20
Noah Flickenger	Lanark	Carroll	20
J. V. Smith	Hays	Douglas	20
Josiah Claridge	Otterville	Jersey	20
D. Hurley	Sandwich	DeKalb	20
W. B. Lewis	Marion	Williamson	20
Louis Forceede	Smithton	St. Clair	20
M. Press, Jr	"	"	20
E. J. Austin	Shumway	Effingham	20
M. B. Williams	Hebron	Shelby	20
Peter Sharp	Elgin	Kane	20
J. T. Thornton	Magnolia	Putnam	20
J. H. Crall	Rinard	Wayne	20
Wm. Kenkel	Ferris	Hancock	20
A. L. Chandler	Gurnee	Lake	20
W. W. Brown	Grayville	White	20
Aug. R. Raney	Forreston	Ogle	20
R. C. Johnson	Jacksonville	Morgan	20
Martin Neff	Petersburg	Menard	20
Peter Hennan	Burtonville	Peoria	20
Freeman Whitney	West McHenry	McHenry	20
D. A. Whitney	" "	"	20
Mrs. Lucy Whitney	" "	"	20
C. W. Harrison	" "	"	20

Carp Distribution—Continued.

Name.	Post Office.	County.	No.
Frank F. Zoller	East St. Louis	St. Clair	
Hon. Balfour Cowen	Virden	Macoupin	
F. P. Beach	Del Rey	Iroquois	
S. L. Nelson	Champaign	Champaign	
Andrew Grussem	Colone	Henry	
Dan'l M. Patterson	Sullivan	Moultrie	
Paul Jones	"	"	
Geo. Denninger	Custer	Perry	
C. R. Barnes	Summum	Fulton	
Wm. Baldwin	Springfield	Sangamon	
Peter Senger	Woodstock	McHenry	
J. H. Dalles	South America	Saline	
Ellis D. Greene	Barry	Pike	
W. W. Barnes	Summum	Fulton	
A. W. Amburn	Pana	Christian	
R. B. Campbell	Rosemond	"	
S. L. Johnson	Marengo	McHenry	
John R. Hand	Elliottstown	Effingham	
J. G. Hubbard	Nokomis	Montgomery	
A. P. Tully	Beecher City	Effingham	
Hon. Jones Tontz	Grant Fork	Madison	
N. D. Miller	Berwick	Warren	
Sam'l Sword	Lanark	Carroll	
Jno. P. Blane	Greenview	Menard	
Dan'l Buzzard	Beecher City	Effingham	
W. E. James	Sciota	McDonough	
James Omera	Rosemond	Christian	
Geo. Aigley	Lena	Stephenson	
John T. Frazer	Onarga	Iroquois	
Jos. D. Arnold	Brownstown	Fayette	
Geo. Accola	Marine	Madison	
E. D. Leland	Lanark	Carroll	
L. B. Phillips	Bryant	Fulton	
Manual Day	Jacksonville	Morgan	
Jos. Kemworthy	Neoga	Cumberland	
Levi Kemworthy	"	"	
John Kemworthy	"	"	
Dr. C. A. Salisbury	Bloom	Cook	
M. F. Schenk	Summum	Fulton	
Rica Aigley	Lena	Stephenson	
John E. Aigley	"	"	
Amos Parke	Coopertown	Brown	
Chas. Huffman	"	"	
Stephen D. Cox	"	"	
Casper Reger	"	"	
W. A. Thomas	"	"	
Franz Weber	Pana	Christian	
Aaron Harford	Verona	Grundy	
Fred. Harford	"	"	
Allen R. Taylor	Rushville	Schuyler	
Sam'l Jones	Lanark	Carroll	
D. B. Boyd	Sparta	Randolph	
L. Horning	Malvern	Whiteside	
Jno. A. Hoblitt	Atlanta	Logan	
Wm. Cronin	Mt. Sterling	Brown	
L. C. Meadows	Abingdon	Knox	
Mary J. Meadows	"	"	
J. W. McElroy	Rosemond	Christian	
W. R. Webb, Jr.	Tunnel Hill	Johnson	
Julius Currikes	Irving	Montgomery	
F. D. Voris	Neoga	Cumberland	
Daniel Sutton	"	"	
Andrew Sutton	"	"	
Alvin M. Voris	"	"	
Henry C. Voris	"	"	
Lewis M. Voris	"	"	
E. H. Comstock, Jr.	"	"	
E. H. Comstock, Sr.	"	"	
J. P. Allenthorp	Greenup	"	
Robt. Bryce	Butler	Montgomery	
R. F. Griffeny	Griswold	Livingston	
Sam'l Miller	Lanark	Carroll	
Ernst Humke	Lena	Stephenson	
Wm. Humke	"	"	
Charles Humke	"	"	
Martin Walks	Neoga	Cumberland	
T. J. Dodge	Hamilton	Hancock	
J. W. Boothe	Bardolph	McDonough	
Mrs. J. W. Boothe	"	"	

Carp Distribution—Continued.

Name.	Post Office.	County.	No.
B. Kassenborg	Viola	Mercer	20
D. L. Maxwell	Malvern	Whiteside	20
H. Craggs	Chicago	Cook	20
J. Wesenberger	Liberty	Adams	20
E. H. Sammons	Peotone	Will	20
James T. Otey	Marion	Williamson	20
Hallet Johnson	Villa Ridge	Pulaski	20
Philip Miller	Dixon	Lee	20
Chas. D. Scundrit	Rockbridge	Greene	20
Marion Therner	Pittsfield	Pike	20
C. H. Figley	LaHarpe	Hancock	20
Wm. R. Kittlekamp	Nokomis	Montgomery	20
John M. Starr	Carmi	White	20
W. G. Wilkins	Adair	McDonough	20
Rudolph Haacke	Chester	Randolph	20
J. L. Spake	Princeton	Bureau	20
Allen R. Turner	Rushville	Schuyler	20
J. M. Leinberger	Dallas City	Hancock	20
Emelis Adams	Alsey	Scott	20
M. M. Martin	Caledonia	Boone	20
Thos. Summerville	Bunker Hill	Macoupin	20
Wm. McDowell	"	"	20
Chas. Shultz	"	"	20
Gabrella Summerville	"	"	20
J. R. Tull	Dallas City	Hancock	20
M. D. Burner	Abingdon	Knox	20
S. W. Baker	Danvers	McLean	20
Geo. Simpkins	Jacksonville	Morgan	20
A. L. Meyers	Freeport	Stephenson	20
F. Rioth	Mt. Sterling	Brown	20
Mrs. F. Rioth	"	"	20
Wm. F. Rioth	"	"	20
M. McIntire	"	"	20
Mrs. Jos. Thirlwell	Galesburg	Knox	20
John Vasey	Jacksonville	Morgan	20
J. K. Sharp	"	"	20
F. L. Sharp	"	"	20
John Hartan	Mendota	LaSalle	20
Henry Haas	Stanford	McLean	20
M. B. Perry	"	"	20
Chas. Wagner	Good Hope	McDonough	20
Wm. Oliver	Norris City	White	20
Valentine Breunfleck	Belleville	St. Clair	20
J. W. Francis	LaFox	Kane	20
Robert Zempel	Woodland	Iroquois	20
G. L. Fombelle	Elgin	Kane	20
C. H. March	Taylor	Ogle	20
J. H. Brady, M. D.	Little Rock	Kendall	20
W. H. Norton	Earlville	LaSalle	20
John A. Meyers	Casner	Macon	20
N. A. Caldwell	Nokomis	Montgomery	20
N. Leister	Green Valley	Tazewell	20
Jas. A. Water	Fairmount	Vermilion	20
Eden Lambird	Latona	Jasper	20
Simon Elbert	Sannemin	Livingston	20
Samuel Jones	Lanark	Carroll	20
Prosper Morrison	Maquon	Knox	20
A. F. Winslow	Osceola	Stark	20
Samuel C. Deal	Bloomington	McLean	20
A. H. Randolph	Green Valley	Tazewell	20
W. W. Johnson	Secor	Woodford	20
G. W. Magee	"	"	20
J. H. Wolf	Lewistown	Fulton	20
Everett Carter	Bryant	"	20
C. V. Brooks	Monmouth	Warren	20
Daniel V. Miller	Westfield	Bureau	20
J. O. Martin	Paxton	Ford	20
Edward Watson	Millersburg	Mercer	20
S. W. Solenberger	Polo	Ogle	20
Henry Martin	Henderson	Knox	20
H. K. Walton	Chesterfield	Macoupin	20
Geo. G. Guenther	Galloway	LaSalle	20
Wm. Aikman	Marion	Williamson	20
Michael Riner	Altoona	Knox	20
Phillip Miller	Dixon	Lee	20
Wm. Cunnen	Aledo	Mercer	20
W. H. Locey	Ashley	Washington	20
Boyd Baldwin	Ellisville	Fulton	20

Carp Distribution—Continued.

Name.	Post Office.	County.	No.
Alonzo M. Thropp	West Liberty	Jasper	20
Mary Horton	Folger	Coles	20
Newton Horton	"	"	20
Emaline Horton	"	"	20
A. Kaney	Forreston	Ogle	20
R. W. McClaughry	Joliet	Will	20
Wm. Reigel	Lake Creek	Williamson	20
E. T. Smith	Good Hope	McDonough	20
S. B. Massey	Denver	Hancock	20
Simon P. Riner	Loran	Stephenson	20
Hon. C. R. Gittings	Terre Haute	Henderson	20
A. B. Douglas	Elgin	Kane	20
Mrs. H. Deal	Summum	Fulton	20
Oscar Farst	Peoria	Peoria	20
H. A. Gros	Ashley	Washington	20
John W. Lambird	Latona	Jasper	20
Jeptha Clark	"	"	20
Schuyler Thompson	Danvers	McLean	20
Wm. W. Wilson	Marissa	St. Clair	20
F. W. Thornton	Magnolia	Putnam	20
A. E. Meyers	Millbrook	Kendall	20
Pete Swisher	Amboy	Lee	20
Thos. Harris	Neoga	Cumberland	20
Bailey Bolin	"	"	20
James Cane	"	"	20
Henry Jaeger	Bloom	Cook	20
B. J. Orendorf	Hopedale	Tazewell	20
C. L. Aten	Astoria	Fulton	20
Michael Humes	Colchester	McDonough	20
J. W. Coyhill	Roseville	Warren	20
L. H. Diehl	Summum	Fulton	20
Luther B. Hicks	White Hall	Greene	20
J. B. McDivitt	Nevins	Edgar	20
John T. Lee	Arthur	Moultrie	20
Josephine Lebo	Mound Station	Brown	20
E. T. Williamson	Cuba	Fulton	20
G. W. Dillow	Mill Creek	Union	20
Edward Moran	Great Creek	Vermilion	20
Charles Buhler	Highland	Madison	20
H. A. Simpson	Pana	Christian	20
J. E. Dodds	Cazenovia	Woodford	20
Jas. Thirlwell	Galesburg	Knox	20
John H. Fowler	Blandinsville	McDonough	20
John Cooper	Lomax	Henderson	20
Mrs. C. H. March	Taylor	Ogle	20
P. L. Harris	Mendota	LaSalle	20
E. Faucher	Westfield	Clark	20
John Ruch	Newton	Jasper	20
Henry Puffer	Downers Grove	DuPage	20
G. H. Petterson	Orion	Henry	20
J. N. Matlock	Newton	Jasper	20
A. C. Walters	Robinson	Crawford	20
Ezekiel Gilbert	Charleston	Coles	20
R. B. Miller	Crete	Will	20
V. F. Locey	Ashley	Washington	20
T. B. Locey	"	"	20
J. Donnelly	Spring Bluff	Lake	20
J. & J. Donnelly	"	"	20
Frank N. Herzog	Blandinsville	McDonough	20
S. S. Clayton	Arthur	Moultrie	20
C. E. Jones	Beardstown	Cass	20
Geo. Oaspery	Morrison	Whiteside	20
Chas. Allen	Carbondale	Jackson	20
Abram Brokaw	Bloomington	McLean	20
C. E. Jones, C. B. & Q	Manito	Mason	20
C. E. Jones, C. B. & Q	Vermont	Fulton	20
J. A. Roberts	Bardolph	McDonough	20
H. P. Faulkner	"	"	20
S. S. Hudson	"	"	20
N. H. Jackson	"	"	20
N. Haller	"	"	20
Abe. Horricks	"	"	20
W. H. Holmes	Gillespie	Macoupin	20
D. M. Sell	Bloomington	McLean	20
J. Chance	Mt. Vernon	Jefferson	20
Jessie T. McClare	Buckley	Iroquois	20
E. T. Walker	Patoka	Marion	20
John Kuhn	Centralia	Clinton	20

Carp Distribution—Continued.

Name.	Post Office.	County.	No.
Albert Hausemann	Central City	Marion	20
Anton Repking	Veni	Effingham	20
Mrs. Guy N. Clark	Centralia	Clinton	20
Aaron N. Johnson	"	"	20
Wm. French	Sanford	Hancock	20
J. F. Tefton	Xenia	Marion	20
F. A. Taylor	Alma	"	20
Richard Wilson	"	"	20
John Kaley	New Hebron	Crawford	20
Anderson Blystone	Neoga	Cumberland	20
D. Mooneyham	Benton	Franklin	20
T. Mooneyham	"	"	20
T. J. Carlisle	Farina	Marion	20
Theo. Niemerg	Veni	Effingham	20
H. Westenderf	"	"	20
John B. Johnson	Newton	Jasper	20
Henry Kelly	"	"	20
Hale Johnson	"	"	20
Samuel Brown	Fairfield	Wayne	20
Karl L. Frez	Dahlgren	Hamilton	20
R. W. Stone	New Burnside	Johnson	20
Roderick Marcheson	Kewanee	Henry	20
Abe Barnesberger	Marshall	Clark	20
F. D. Richardson	Newton	Jasper	20
Conrad Hole	Crete	Will	20
L. Puffer	Downer's Grove	DuPage	20
H. E Puffer	" "	"	20
W. S. Puffer	" "	"	20
W. H. Putnam	Friendsville	Wabash	20
T. A. Drain	Leon	Whiteside	20
E. C. Madison	Marshall	Clark	20
G. B. Dovell	Latona	Jasper	20
Jno. R. Gray	Belleville	St. Clair	20
Sam'l G. Hatch	Vernon	Marion	20
James Hanke, Jr.	Trenton	Clinton	20
James Hanke, Sr	"	"	20
J. D. Price	Shattuc	"	20
Dan'l Wiley	Makanda	Jackson	20
Wm. Sieling	Elkhorn	Washington	20
Herman D. Yost	Du Bois	Perry	20
Hon. C. Beckwith	Chicago	Cook	50
H. Franzen	Basco	Hancock	20
J. E. Hugo Herman	Sigel	Shelby	20
Thos. Battels	Nokomis	Montgomery	20
Hugh Doyle	Anna	Union	20
R. N. Norris	Vernon	Marion	20
A. W. Silkinson	Belmont	Wabash	20
Stephen M. Smith	Pana	Christian	20
Peter Narey	Alma	Marion	20
David Bowman	Annapolis	Crawford	20
Ed. A. Ebbert	Montrose	Jasper	20
Thos. J. Warren	Belleflower	McLean	20
Louis Boatright	Hartford	Saline	20
John Van Gundy	Macon	Macon	20
Fred'k Finger	Centralia	Clinton	20
Peter Heiss	"	"	20
Amos Weedman	Farmer City	DeWitt	20
W. S. Cocke	Centralia	Clinton	20
W. A. Vernon	Rinard	Wayne	20
Dan'l Moneyham	Benton	Franklin	20
J. H. Harris	Holt	Perry	20
E. Renner	Loran	Stephenson	20
Anna Spurgeon	"	"	20
Chas. E. Renner	"	"	20
Geo. Renner	"	"	20
M. Neighoof	"	"	20

NATIVE FISH DISTRIBUTION.

We give herewith a list of the rivers and streams ordered planted with native fish during the past two years. This work has been performed mainly by messenger service, although we have used the express companies to a considerable extent during the past season. (1886). The need of a car for this branch of the service has never been felt so greatly as this season, and the successful operation of such cars by the other commissions has demonstrated the practicability of their use. The percentage of loss in transit is much less, and a very much larger number can be carried at one trip than by the service now in use by us.

There is not the danger of loss or the inconvenience where delays occur, in making railroad connections, as must be the case when baggage cars or passenger trains are used.

By the use of the pumping appliances connected with such cars which gives a continuous water supply, fish can be cared for during the protracted lay-overs without danger of loss.

The Government has almost entirely abandoned the old messenger service and have constantly in use the cars for such purpose.

On Chicago, Burlington and Quincy Railroad:

Des Plaines River.
Salt Creek.
East Du Page River.
West Du Page River.
Fox River.
Rob Roy Creek.
Big Rock Creek.
Little Indian Creek
Little Indian Creek.
Main Bureau.
Henderson River.
Fox River.
Illinois River.
Indian Creek.
DuPage River.
Greene River
Rock River.
Rock Creek.
Main Bureau.
Big Rock Creek.
Little Rock Creek.
Coal Creek.
Spoon River.
Cooper's Creek.
Otter Creek.
Spoon River.
Kepple Creek.
Crooked Creek.
Bear Creek.
Edwards Creek.

Edwards River.
Henderson River.
Pigeon Creek.
Hadley Creek.
McCranny Creek.
Kaiser Creek.
Dutch Creek.
Bear Creek.
Rock Creek.
Rock Creek.
Rock River.
Edwards River.
Pope Creek.
North Henderson Creek.
Middle Henderson Creek.
Sugar Creek.
Illinois River.
Indian Creek.
Apple Creek.
Macoupin Creek.
Wood River.

On Chicago and Alton Railroad:

Kankakee River near Wilmington.
Mackinaw River near Lexington.
Salt Creek near Lincoln.
Kickapoo Creek near Lawndale.
Sangamon River near Springfield.
Macoupin Creek near Macoupin.
Wood River near Alton.
Long Lake near Mitchell.
Cahokia Creek near East St. Louis.
Macoupin Creek near Riverdale.
Sangamon River near Petersburg.
Illinois River at Pearl.
Vermilion River at Pontiac.

On Illinois Central Railroad:

Kankakee River at Kankakee.
Bushy Creek near Neoga.
Green Creek near Sigel.
Little Wabash River near Mason.
Dismal Creek near Laclede.
Lower Cache, 1 mile north of Mounds.
Upper Cache at Ulm.
Drury Creek at Waukanda.
Drury Creek, ¼ mile north of Waukanda.
Big Muddy River, 2 miles north of DeSoto.
Little Muddy River, 2 miles north of DuBois.
Crooked Creek, ¾ mile north of Central City.
East Fork Kaskaskia River, 4 miles north of Patoka.
North Fork Kaskaskia River, 1½ miles north of Patoka.
Flat Creek, one mile north of Vernon.
Branch of Kaskaskia, 2 miles north of Shabonier.
Coal Creek, 1½ miles south of Pana.
Sangamon River, 1½ miles south of Decatur.
Salt Creek, 3½ miles south of Clinton.
Kickapoo Creek, 1 mile north of Heyworth.
Sugar Creek, 1 mile north of Bloomington.
Mackinaw River, 1 mile south of Kappa.
Illinois River at LaSalle.
Bureau Creek, 3 miles south of Sublette.
Inlet Creek, ¼ mile south of Amboy.
Rock River, ½ mile north of Dixon.
Buffalo Creek, ½ mile north of Polo.
Leaf River, 2 miles north of Foreston.
Apple River, 1½ miles north of Apple River.
East Fork Galena River, 1 mile east of Council Hill.
East Fork Galena River, 2¾ miles west of Council Hill.
Galena River at Galena.
Big Menominee River, 4 miles west of Menominee.
Vermilion River, 1¼ miles north of Charlotte.
Vermilion River, 1½ miles west of Pontiac.
Sangamon River near Springfield.
Salt Creek, 1¾ miles north of Kenney.
Salt Creek, 3 miles south of DeWitt.

On Peoria, Pekin and Jacksonville Railroad:

Kickapoo Creek, 3½ miles south of Pekin.
Illinois River at Pekin.
Mackinaw River, 1 mile south of Grand Bluff.
Sangamon River, 1¼ miles north of Chandlerville.

On Wabash, St. Louis and Pacific Railroad:

Little Wabash River, between Shumway and Effingham.
Okaw River, between Windsor and Bruce.
Vermilion River, between Pontiac and Darrell.
Kankakee River, between Essex and Ritchie.
Sangamon River, between Sangamon and Decatur.
Sangamon River, between Riverton and Springfield.
Sangamon River, between Decatur and Boody.
Sangamon River, between Monticello and Lodge.
Sangamon River, between Woods and White Heath.
Sangamon River, between Monticello and Argenta.
Sangamon River, between Taylorville and Clarksdale.
Illinois River at Meredosia.
Illinois River at Valley City.
Cahokia Creek near Edwardsville.

On Ohio and Mississippi Railroad:

Wabash River at Vincennes.
Embarras River, 1 mile east of Lawrenceville.
Little Wabash River, 1 mile east of Clay City.
Kaskaskia River at Carlyle.
Illinois River at Beardstown.
Spring Creek, 3 miles southeast of Springfield.
South Fork of Sangamon River, 2 miles northwest of Rochester.
Flat Branch, 1½ miles southeast of Taylorville.
Okaw River, 2 miles southeast of Cowden.
Skillet Fork, 1½ miles south of Mill Shoal.

On Peoria, Decatur and Evansville Railroad:

Illinois River at Pekin.
Mackinaw River, 8 miles south of Pekin.
Sugar Creek, 5 miles northwest of Lincoln.
Kickapoo Creek, 2 miles northwest of Lincoln.
Salt Creek, 3 miles south of Mt. Pulaski.
Sangamon River, 1 mile south of Decatur.
Okaw (West Fork) River, 5 miles northwest of Sullivan.
Okaw (East Fork) River, 3 miles southeast of Sullivan.
Embarras River, at Greenup.
Embarras River, at Grayville.
Wabash River, at Newton.

On Lake Erie and Western Railroad:

Kickapoo River.
Sangamon River.
West Fork Vermilion.
North Fork Vermilion.

On Chicago and Northwestern Railroad:

Rock River.
Fox River.
Des Plaines River, at Maywood.
DuPage River, 1½ miles west of Winfield.
West Kishwaukee River, at DeKalb.
Elk Horn River, 1 mile west of Galt.
East Kishwaukee River, at C. Valley.
Nippersink River, 3 miles south of Richland.
Pecatonica River, at Freeport.

On Indiana, Bloomington and Western Railroad:

Vermilion River, at Danville.
Salt Fork, at Oakwood.
Mid-Ford Vermilion, near Danville.
Sangamon River, at Mahomet.
Mackinaw River, at Mackinaw.
St. Joseph River, at St. Joseph.

On Chicago and Eastern Illinois Railroad:

Calumet River, 1 mile north of Dalton.
Calumet River, 2 miles south of Dalton.
Kankakee River, at Momence.
Iroquois River, at Watseka.
Sugar Creek, between Watseka and Woodland.
Little Vermilion, 2 miles south of Danville.

On Jacksonville Southeastern Railroad:

Shoal Creek.
Kaskaskia.

Recapitulation of Expenditures by Illinois State Fish Commissioners from October 1, 1884, to September 30, 1886.

VOUCHERS AND BILLS OF PARTICULARS ON FILE WITH THE AUDITOR.

Amount to credit of Commissioners October 1st, 1884		$2,998 99	
Appropriation for 1885		6,000 00	
Cash from sale of condemned boats		18 00	
" " carp distribution		81 50	
		$9,098 49	
DR.			
Amount expended by S. P. McDole, 1883	$337 84		
" " October, 1884	504 52		
" " November, 1884	395 24		
" " December, 1884	250 50		
" " January, 1885	286 90		
" " February, 1885	292 10		
" " March, 1885	251 40		
" " April, 1885	379 89		
" " May, 1885	427 85		
" " June, 1885	893 94		
" " July, 1885	705 58		
" " August, 1885	751 16		
" " September, 1885	416 93		
		$5,893 85	
Amount to credit of Commissioners October 1st, 1885			$3,204 64
Appropriation for 1886			6,000 00
Cash from sale of condemned property			26 00
" " carp distribution			96 00
			$9,326 64
DR.			
Expenditures for October, 1885		$600 12	
" " November, 1885		521 55	
" " December, 1885		490 15	
" " January, 1886		407 03	
" " February, 1886		306 40	
" " March, 1886		462 65	
" " April, 1886		595 71	
" " May, 188		629 25	
" " June, 1886		681 89	
" " July, 1886		688 24	
" " August, 1886		613 60	
" " September, 1886		517 00	
			6,463 59
Amount to credit of Commission October 1st, 1886			$2,863 05

FISH COMMISSIONERS.

List of Fish Commissioners and Officers of United States and Canada:

THE UNITED STATES—
Prof. Spencer F. Baird.....Washington, D. C.

ALABAMA—
Col. D. R. Hundley.....Madison.
Hon. Charles S. G. Doster.....Prattville.

ARIZONA—
J. J. Gosper.....Prescott.
Richard Rule.....Tombstone.
J. H. Taggart, business manager.....Yuma.

ARKANSAS—
James H. Hornibrook.....Little Rock.
H. H. Rottaken.....Little Rock.
[These were the officers last year; we have not been able to get replies from them.]

CALIFORNIA—
R. H. Buckingham, President.....Sacramento.
Hon. A. B. Dibble, Secretary and Treasurer.....Grass Valley.
Thomas J. Sherwood.....Marysville.

CANADA—
Hon. John Tilton, Deputy Minister of Fisheries.....Ortawa, Ont.

PROVINCE OF NEW BRUNSWICK—
W. H. Venning, Inspector of Fisheries.....St. John.

PROVINCE OF NOVA SCOTIA—
W. H. Rogers, Inspector.....Amherst.
A. C. Bertram, Assistant Inspector.....North Sydney.

PROVINCE OF PRINCE EDWARDS ISLAND—
J. H. Duvar, Inspector.....Alberton.

PROVINCE OF QUEBEC—
W. Wakeham, Inspector Lower St. Lawrence and Gulf Division.....Gaspi Basin.

PROVINCE OF BRITISH COLUMBIA—
Thos. Morrat, Acting Inspector.....New Westminster.

PROVINCE OF MANITOBA AND NORTHWEST TERRITORIES—
Alex. McQueen, Inspector.....Winnipeg, Man.
S. Wilmot, Superintendent of Fishculture.....Newcastle, Ont.

COLORADO—
John Pierce.....Denver.

CONNECTICUT—
Dr. Wm. M. Hudson (term expires Aug. 26, 1889).....Hartford.
Robert G. Pike (term expires March 8, 1889).....Middletown.
James A. Bill (term expires Aug. 26, 1887).....Lyme.

DELAWARE—

Enoch Moore (term expires April 23, 1887)..... Wilmington.

GEORGIA—

Hon. J. T. Henderson, Commissioner of Agriculture..... Atlanta.
Dr. H. H. Cary, Superintendent of Fisheries..... LaGrange.
(Under the laws of the State these constitute the Board of Fish Commissioners.)

ILLINOIS—

N. K. Fairbank, President..... Chicago.
S. P. Bartlett, Secretary..... Quincy.
Major George Breuning..... Centralia.

INDIANA—

Enos B. Reed (term expires in 1887)..... Indianapolis.

IOWA—

E. D. Carlton..... Spirit Lake.

KANSAS—

S. Fee..... Wamego, Pottawattamie county.

KENTUCKY—

Wm. Griffith, President..... Louisville.
P. H. Darby..... Princeton.
John B. Walker..... Madisonville.
Hon. C. J. Walton..... Mumfordville.
Hon. John A. Steele..... Midway.
W. C. Price..... Danville.
Dr. W. Van Antwerp..... Mt. Sterling.
Hon. J. M. Chambers..... Independence, Kenton county.
A. H. Goble..... Catlettsburg.
J. H. Mallory..... Bowling Green.

MAINE—

E. M. Stillwell..... } Commissioners of } ..... Bangor.
Henry O. Stanley. } Fish and Game... } ..... Dixfield.
B. W. Counce, Commissioner of Sea and Shore Fisheries..... Thomaston.

MARYLAND—

G. W. Delawder..... Oakland.
Dr. E. W. Humphries..... Salisbury.

MASSACHUSETTS—

E. A. Brackett..... Winchester.
F. W. Putnam..... Cambridge.
E. H. Lathrop..... Springfield.

MICHIGAN—

Dr. J. C. Parker..... Grand Rapids.
John H. Bissell..... Detroit.
Herschel Whitaker..... Detroit.
(W. D. Marks, Superintendent..... Paris.
(A. J. Kellogg, Secretary..... Detroit.

MINNESOTA—

First District—Daniel Cameron..... LaCrescent.
Second District—Wm. M. Sweney, M. D..... Red Wing.
Third District—Robert Ormsby Sweney, President..... St. Paul.
(S. S. Watkins, Superintendent..... Red Wing.)

MISSOURI—

J. G. W. Steedman, M. D..... 2803 Pine street, St. Louis.
Gen. J. L. Smith..... Jefferson City.
H. M. Garliech..... St. Joseph.

NEBRASKA—

W. L. May..... Fremont.
R. R. Livingston..... Plattsmouth.
B. E. B. Kennedy..... Omaha.

NEVADA—

W. M. Cary..... Carson City.

NEW HAMPSHIRE—

George W. Riddle..... Manchester.
E. B. Hodge..... Plymouth.
John H. Kimball..... Marlboro.
(E. B. Hodge, Superintendent.)

NEW JERSEY—

Richard S. Jenkins.....Camden.
William Wright.....Newark.
F. M. Ward.....Newton.

NEW YORK—

Hon. R. Barnwell Roosevelt, President.....17 Nassau St., New York.
Gen. Richard U. Sherman, Secretary.....New Hartford, Oneida County.
Eugene G. Blackford.....Fulton Market, New York.
William H. Bowman.....Rochester.
(Superintendents—Seth Green, Rochester; Fred Mather, Cold Spring Harbor; Monroe A. Green, Munford, Monroe Co.; F. A. Walters, Bloomingdale, Essex Co.)
Secretary, H. H. Thompson.....P. O. Box 25, New York City.

NORTH CAROLINA—

(A note from Col. M. McGehee, Raleigh, the former Commissioner, under date of Aug. 9, says: "There is no Fish Commissioner in the service of the State.")

OHIO FISH AND GAME COMMISSION—

C. V. Osborn, President.....Dayton.
A. C. Williams.....Chagrin Falls.
Judge H. B. Ingalls.....Huntsville.
John Hoffer.....Bellaire.
C. W. Saddler.....Sandusky.

PENNSYLVANIA—

John Gay, President.....Greensburg.
H. H. Derr, Secretary.....Wilkesbarre.
Arthur Maginnis.....Swift Water, Monroe Co.
A. M. Spangler, Cor. Sec., 512 Commerce street.....Philadelphia.
Aug. Duncan, Treasurer.....Chambersburg.
Charles Porter.....Corry.

RHODE ISLAND—

John H. Barden.....Rockland.
Henry T. Root.....Providence.
Wm. P. Morton.....Providence.

SOUTH CAROLINA—

Hon. A. P. Butler.....Columbia.
Commissioner of Agriculture.

TENNESSEE—

W. W. McDowell.....Memphis.
H. H. Speed.....Chattanooga
Edward D. Hicks.....Nashville.

VERMONT—

Hiram A Cutting.....Lunenburgh.
Herbert Brainerd.....St. Albans.

VIRGINIA—

Col. Marshall McDonald.....Berryville.

WASHINGTON TERRITORY—

Albert T. Stream.....North Cove, Pacific Co.

WEST VIRGINIA—

C. S. White, President.....Romney.
W. A. Manning, Secretary.....Talcott.
F. J. Baxter, Treasurer, (term expires June 1, 1889).....Braxton Court House.

WISCONSIN—

The Governor, *ex officio*.
Philo Dunning, President.....Madison.
C. L. Valentine, Secretary and Treasurer.....Janesville.
J. V. Jones.....Oshkosh.
A. V. H. Carpenter.....Milwaukee.
Mark Douglas.....Melrose.
Calvert Spensley.....Mineral Point.
James Nevin, Superintendent.....Madison.

WYOMING TERRITORY—

Otto Gramm.....Laramie.

[Dr. W. N. Hunt, Cheyenne, is Commissioner for Laramie county, and B. F. Northington, Rawlins, is Commissioner for Carbon county.]

CORRESPONDENTS.

We give herewith about an average of the individual replies as received in answer to our inquiries, regarding growth, condition of carp and native fish.

A. A. SHORT, of Percy, Randolph county, says April 2. "I received my carp November, 1884. They are now 11 to 12 inches long and weigh from 1½ to 2 pounds. They have not spawned. I use grain for food."

WM. B. TIBBE of Albion, Edwards county, April 2. "I received my carp in fall of 1884. Last June they were from 8 to 10 inches long and weighed from ¾ to 1 pound."

ELI BECKLEY of Coulterville, Randolph county, April 2. "I received my carp in fall of 1884. They are at present from 10 to 14 inches long and weigh from 2½ to 3 pounds. They spawned last year and I have a great number of young carp. I feed them, about once a week through the summer, a little boiled corn meal."

FRANK GUNDLACH of Carlyle, Clinton county, April 2. "I received my carp in November, 1884. They are from 8 to 14 inches length, and weigh from 1 to 4 pounds. They spawned during the summer of 1885. Feed bread, potatoes, etc., two or three times a week."

JOHN M. HALBERG, Heinricktown, St. Clair county, April 1. "Received carp November, 1883. They are from 22 to 26 inches in length and weigh from 6 to 9 pounds. They spawned in May, 1885. I have sold 6000 young ones and have plenty left. Feed once a day potatoes, wheat, corn, etc."

GEO. ROEMHILD, Cutler, Perry county, April 4. "Received carp November 17, 1884. They are from 17 to 18 inches long and weigh from 3 to 5 pounds. They have not spawned yet."

C. W. PAVEY, Mt. Vernon, Jefferson county, April 5, 1886. "Received carp in fall of 1885. Now from 6 to 7 inches long."

F. W. KASTRUP, Venedy, Washington county, April 3, 1886. "I received carp, Nov., 1883. They are now from 15 to 16 inches in length and weigh from 5 to 6 pounds. Feed shipstuff and potatoes about once a week."

F. A. WILDERMAN, Freeburg, St. Clair county, April 3. "I received my carp in November, 1884. They are now from 15 to 20 inches long and weigh from 4 to 5 pounds. They have not spawned yet. Feed twice a week, potatoes and corn meal mixed."

MARTIN MAYER, Conant, Perry county, April 3, 1886. "I received my carp December 18, 1884. They are from 12 to 16 inches long and weigh from 1½ to 2½ pounds. They have not spawned yet."

CONRAD SORG, Freeburg, St. Clair county, April 3, 1886. "Received my carp in November, 1884. They are from 15 to 20 inches long and weigh from 4 to 5 pounds. They have not spawned yet. I feed potatoes and meal mixed twice a week."

CHRIST. TOOS, Central City, Marion county, September 6, 1886. "I received my carp November 14, 1884. They are from 20 to 22 inches long and weigh from 6 to 8 pounds. They spawned in 1885. I have at least 10,000 young carp. I feed them boiled corn once or twice a week throughout the season."

JAS. NISWANGER, Atlanta, Logan county, April 2, 1886. "I received my carp in fall of 1885. They measure from 10 to 12 inches and weigh from 2 to 3 pounds."

JOHN BEHRENS, O'Fallon, St. Clair county, April 4, 1886. "I received my carp in fall of 1883 and 1884. They are from 16 to 18 inches and weigh from 3 to 10 pounds. I do not feed."

R. A. HUNT, Olney, Richland county, April 4, 1886: "I received my carp in fall of 1884. They measure from 2 to 4 inches in length and weigh from 2 to 4 pounds. I do not feed them any."

A. M. MCCLAIN, Enfield, White county, April 2, 1886: "I received my carp in fall of 1883, 1884 and 1885. They are now from 7 to 20 inches in length and weigh from 1 to 15 pounds. The oldest spawned in May and June."

JACOB SPECHT, Trenton, Clinton county, April 12, 1886: "I received my carp in 1884, about a year and a half ago. They are now about 12 inches long. There seems to be plenty of young carp in the pond."

J. RANDALL, Okawville, Washington county, April 5, 1886: "I received my carp in November, 1884. They are from 11 to 12 inches long and weigh from 2 to 2½ pounds."

R. POINDEXTER, Thompsonville, Franklin county, April 7, 1886: "I received my carp September, 1884. They are from 8 to 12 inches long; average weight from 1 to 2 pounds."

HON. B. W. STRATTAN, Mt. Vernon, Jefferson county, April 11, 1886: "I received my carp in the fall of 1884. They are from 6 to 9 inches long."

WM. C. WERNE, Wine Hill, Randolph county, April 1, 1886: "I received my carp in November, 1884. They weigh from 2½ to 3 pounds."

HENRY BENDER, Carlyle, Clinton county, April 7, 1886: "I received my carp about 18 months ago, in 1884, and they are from 8 to 10 inches long. They spawned last spring."

A. C. MCMURPHY, Makanda, Jackson county, April 6, 1886: "I received my carp in November, 1884. Now from 12 to 14 inches long."

EMIL BUEHLER, of Centralia, Ill., writes to Major George Breuning as follows: "My ponds are situated near the city limits of Centralia. There are two of them, the smaller one about 40x60 feet, the largest 120x180 feet. The water runs through the small pond into the large one. I received my carp in November, 1885. They were about 1½ inches long. In April they were 6-7 inches in length; at the end of June 10-12 inches long, and in September from 14-16 inches long and about 3-3½ wide. Their average weight was 3½ pounds. They have not spawned yet. I did not feed them during winter months: in summer about twice a week."

Mr. MICHAEL RINER, of Altona, Ill.: "Seeing a notice of the distribution of carp, I desire to have my name among them. We were unfortunate in our effort at carp culture. The flood of May 12th overflowed our pond. In August we drew off such water as was left to see if any of our fish remained. We found seven that would weigh five pounds." * * *

Mr. F. W. THORNTON, of Magnolia, Ill., writes: * * * "I have built another pond about as large as my first one. Week before last Wash Graff, of Morgan county, came up to visit me. Some years ago I wrote to you for him making application for carp. He received 11 little ones. On his return from his visit I went home with him, and in seining for breeding carp we estimated we caught from 2,000 to 3,000 old fish from 8 to 12 inches in length. I bought and brought home 25 breeding carp for my pond. We caught from another pond, while seining for smaller ones, 6 that would average 18 to 20 inches in length, at one haul." * * *

JOHN MARTIN, Mendota, Ill., writes: "The carp I received of you last year weigh about three pounds each. Carp received last winter."

MICHAEL HUME, Colchester, Ill., writes: "My dams broke, and carp were washed out. Two different parties found carp in the creek below. One weighed 3½ pounds, the other 5 pounds. The carp were received in November, 1885."

R. P. ANDERSON, Iola, Clay county, Ill., date July 24, 1886, writes: "I received the 14th of last December 20 carp. They are doing splendid. They outgrow anything I have ever seen. Some of them will weigh two pounds. I think I will have a good supply of young carp next season."

JOHN FORDYCE, of Berrick, Ill., date September 10, 1886, writes: "In your letter you seem to think that the young fish are not from the carp of last year. There has not to my knowledge been any other fish put in the pond. They could not get in unless some one put them in. There are no streams running into it. I was afraid when I first saw the young fish that some one might have put other fish in there, but my fears on that score were soon dispelled, for upon watching them, their growth, habits, etc., convinced me they were young carp. They are as large now as were those received from you last fall. Everybody expresses surprise that the old ones have made such a remarkable growth. They are now from 12 to 14 inches long. Should you come over C. I. R. R. stop and see fish from one year old carp. I see by the paper that James Harris, of Princeton, says that some fish he sold to a neighbor have spawned at one year old.

Mr. JOHN WEIGAND, Mt. Sterling, Ill., date of Oct. 16, 1886, writes: "The carp I received from you last March are doing very well. They have made a remarkable growth. They will weigh 3 to 4 pounds apiece, and they were not as long as my finger last March."

Mr. J. N. BAN, of Odin, Ill., says: "You ask me to advise you as to the condition of my fish. I shall be glad to do so. I received my fish about the middle of April, 1886, and to-day I had one caught. It was 14 inches long, 4½ inches broad and weighed 2 pounds. They were about 3 inches long when I received them. Knowing this I would advise every farmer who may have a suitable place for a pond, not to hesitate any longer but act at once."

JAMES HARRIS, Jr., Princeton, Ill., writes: "In reply to your letter will say that my fish have done well. I received my first carp from Aurora, (S. P. McDole) 21 in number, 15th of November, 1883. In November, 1884, I received 15 more from you, sent from Quincy through Hon. L. D. Whiting. The first fish I received spawned in May and June, 1885. In October and November, 1885, I took 5,000 little ones from my hatching pond. I put 3,400 in a larger pond and the rest I sold to farmers for their ponds.

"We have been catching fish from our large pond all summer that will weigh 1¼ to 2 pounds each. They are one year old past. This fall I have taken 1,600 small fish from my hatching pound. There were some left in the pond when I got through. As to growth, last Wednesday, the 10th, I took two of my oldest fish from a small pond where I had them; one I sent to Chicago the other we kept and used ourselves. One of them weighed 7 pounds; the other 8 pounds. They were nearly three years old and I think they are a very nice fish to eat."

SIMON P. RENNER, of Loran, Stephenson County, writes: "I have two ponds; they are small. I dug them out on level ground about eight years ago. They are 60 feet long by 22 feet wide, with four feet depth of water fed by springs. I first put in 100 California Salmon which all died in two years. Then I tried 1,300 California Salmon and a few Speckled Trout; lost all the salmon but the trout did very well. Then I tried native fish. I put in about 200 Buffalo, 200 Pickerel, some Black Bass. They have done well. The Pickerel showed from one pound when planted to sixteen pounds; Buffalos from one to twelve pounds each, and Bass correspondingly rapid. I did not feed them anything."

MENDOTA, ILL., NOV. 6, 1886.

Hon. S. P. Bartlett, State Fish Commissioner, Quincy, Ill.:

SIR—In the summer of 1884 the C. B. & Q. R. R. excavated a large pond of about 50 acres just north of Mendota, the purpose of which was to obtain a reservoir of good water for railroad purposes. The pond was from one to eighteen ft. in depth, bottom of clay and loam and free from fish and supplied by surface drainage. It was believed by those interested in the subject that the conditions were very favorable for testing the growth of the German Carp. Upon being advised, you kindly furnished us from time to time with a few. In the fall of 1884, the first supply were put into the pond above described, being at that time what is known as fry.

In June 1886, nine of said carp were taken out with a seine and were found to average within two ounces of eight pounds each. This growth was all accomplished in less than two years. As astonishing as these statements are they can be relied on as entirely true, as the weights were taken in presence of numerous persons. The specimens taken embraced from appearances the Scale, Mirror and Leather Carp and no difference of consequence appeared in size and condition.

Yours,

L. B. CROOKER.

The following letter from Mr. Wm. Wilkinson, Division Superintendent of the Illinois Central Railroad, will, we think, show the great growth and increase of native fish and carp in the waters of the State, where protected. The reservoir spoken of is simply a pond supplied by surface water:

ILLINOIS CENTRAL RAILROAD COMPANY.
OFFICE OF DIVISION SUP'T,
SPRINGFIELD, NOV. 11, 1886.

S. P. BARTLETT, ESQ., *Fish Commissioner, Quincy, Ill.:*

DEAR SIR—We drew a seine through our Clinton reservoir yesterday, and took out ten (10) fine specimens of the German carp, aggregating in weight eighty-four (84) pounds, the largest weighing fourteen and one-half (14½) pounds and the smallest seven (7) pounds, and the three largest weighed thirty-nine (39) pounds. Also took fifty-seven (57) fine black bass, aggregating one hundred and ten (110) pounds, the largest weighing four and one-half (4½) pounds.

I think we took only a small portion of the fish, and am of the opinion that the bass predominate in numbers. We found a very few small carp, perhaps not more than three or four, weighing not more than a pound or two apiece. The water in the pond had receded to a depth of about twelve inches, and fearing it would freeze solid, I concluded to save a portion of the fish at least. My recollection is that you put in the fish about three years ago.

(Signed.) WILLIAM WILKINSON,
Division Sup't.

The fish were planted in a reservoir as follows, viz: Bass, croppies, etc., in the summer of 1882; the carp the following fall and winter.

A CATALOGUE OF THE NATIVE FISHES OF ILLINOIS.

BY S. A. FORBES, PH. D.

Professor of Zoölogy, University of Illinois.

CATALOGUE.

Class I. PISCES. (The True Fishes.)

Sub-class Physoclisti.

Order I. ACANTHOPTERI. (The Spiny-rayed Fishes.)

Family I. GADIDÆ. (Cod-fishes.)

Genus 1. Lota, Cuvier.

1. *Lota maculosa* Le Sueur.—Burbot; Ling; Eel Pout.
Taken only in Lake Michigan.

A single specimen occurred some years ago at Naples, on the Illinois River, having evidently entered the river through the canal, then recently opened to the Chicago River.

Family II. COTTIDÆ. (The Sculpins.)

Genus 2. Uranidea, De Kay.

2. *Uranidea richardsoni*, Agassiz.—Miller's Thumb; Blob; Muffle-jaw; Bull-head.

(Bul. II, 50; *Potamocottus alvordi*, *Potamocottus wilsoni*, *Potamocottus meridionalis*.)

This species, the only representative of its family known positively to occur within the limits of our State, is by far the most abundant in Southern Illinois, where it is a common creek species, nestling under stones in shallows and rapids. A single specimen from a muddy stream in McHenry county, and a few from the shallow waters of Lake Michigan, are the only representatives in our collections from the northern part of the State. Other species of this family occurring in Lake Michigan have been found only in the deeper waters outside our limits.

Family III. SCIÆNIDÆ.

Genus 3. Haploidonotus, Rafinesque.

Fresh-water Drums.

3. *Haploidonotus grunniens*, Raf. — Sheepshead; Drum; White Perch; Croaker.

This species occurs in Illinois only in the great lakes and in rivers, occasionally in spring finding its way into creeks tributary to the Illinois and the Ohio.

Family IV. SERRANIDÆ. (The Sea Bass.)

Genus 4. Roccus, Mitchill.

Bass.

4. *Roccus interruptus*, Gill.—Yellow Bass; Striped Bass; Brassy Bass.

(Bul. II, 44; *Morone interrupta.*)

This species has not occurred in Northern Illinois to our knowledge, but has been collected by us almost wholly in the Illinois River and in the bottom lakes connected with that stream.

5. *Roccus chrysops*, Raf.—White Bass; Silver Bass.

Throughout Illinois, in creeks and rivers, and in Lake Michigan, much more rarely in the small northern lakes. It seems, indeed, to be wholly wanting in the lakes of the Fox River system, in which it is said by the older fishermen to have been exterminated by severe winters some years ago. The presence of impassable fish-dams in the Fox River, through which these lakes are drained, probably accounts for its non-appearance since.

Family V. PERCIDÆ.

Sub-family Percinæ. (The True Perches.)

Genus 5. Stizostedium, Raf.

Pike Perches.

6. *Stizostedium canadense*, Smith.—Sauger; Sand-Pike; Gray-Pike.

The distribution of this species in Illinois is precisely like that of the following.

7. *Stizostedium vitreum*, Mitch.—Wall-eyed Pike; Dory; Glass-eye; Yellow Pike; Blue Pike; "Jack Salmon."

Found only in the larger rivers and lakes; occurring in our collections from the Wabash, Illinois, and Rock Rivers. Especially abundant in the former at the rapids above Mt. Carmel.

Genus 6 Perca, Linnæus.

Perch.

8. *Perca americana*, Schranck.—Yellow Perch; American Perch; Ringed Perch.

A very abundant species in the northern part of the State; excessively common in Lake Michigan, where it is caught from the wharves by thousands daily. Also swarming in the small northern lakes, and one of the commonest fishes in the clearer creeks and rivers. In Central Illinois it is somewhat rare, occasional specimens only occurring in the Illinois. In the southern part of the State we have not seen it at all, not a single specimen, in fact,

occurring in our collections south of the latitude of Alton. Southward its common name even is applied to other species—the various sunfishes. There is a uniform average difference in brightness of color between the lake and river specimens, the latter being much the brighter, but there are no specific distinctions.

Sub-family Etheostómatinæ. (The Darters.)

Genus 7. Microperca, Putnam.

9. *Microperca punctulata*, Putnam.—Least Darter.

This little species, the smallest of our fishes, is much the commonest northward, but has been taken as far south as Union county. It is less select in its haunts than most of the other Darters, occurring in waters of every description; but we have found it commonest in lakes, and scarcely less abundant along the weedy margins of larger rivers.

Genus 8. Etheostoma, Raf.

10. *Etheostoma eos*, Jor. & Copeland.

(Bul. II. 42; *Boleichthys eos:* Synop., *Pœcilichthys eos.*)

Not especially common in Illinois; chiefly of northern distribution; most abundant in lakes, and occurring also in the smaller rivers.

11. *Etheostoma fusiforme*, Grd.

(Bul. II, 43; *Boleichthys elegans:* Synop., 519 & 520; *Pœcilichthys butlerianus, Pœcilichthys barrati, Pœcilichthys fusiformis.*)

This darter, which has appeared in the earlier lists as *Boleichthys elegans*, is southern in its Illinois distribution, not having occurred north of the Kaskaskia River. To the southward it is rather common in lakes, clear ponds, small rivers and creeks.

12. *Etheostoma asprigene*, Forbes.

(Bul. II, 41; *Pœcilichthys asprigenis:* Synop., 518; do.)

This common species, originally described from the Illinois River, has since been found generally distributed in the central and southern parts of the State, in lakes and rivers, large and small, but has not been taken in Northern Illinois.

13. *Etheostoma cæruleum*, Storer.—Blue Darter: Rainbow Darter: Soldier-fish.

(Bul. II, 41; *Pœcilichthys variatus, Pœcilichthys spectabilis:* Synop.; 517 & 518; *Pœcilichthys cæruleus, Pœcilichthys spectabilis.*)

The most highly colored of our common darters, occurring throughout the State in lakes, rivers, and creeks, much the most abundant in the latter.

14. *Etheostoma flabellare*, Raf.

Not common. Clear creeks and rivers in Southern Illinois.

15. *Etheostoma lineolatum*, Agassiz.—Striped Darter.

(Bul. II, 42; *Etheostoma flabellare*, var. *lineolatum.*)

Rather rare; chiefly from Northern Illinois, in creeks and rivers.

16. *Etheostoma zonale*, Cope.

(Bul. II, 41; *Nanostoma zonale:* Synop., 510; do.)

This little darter is not common in Illinois, and is confined to the northern part of the State, as far as our collections show, where it occurs in creeks and the smaller rivers.

Genus 9. Hadropterus, Agassiz.

17. *Hadropterus evides*, Jordan & Copeland.

(Bul. II, 39; *Ericosma evides:* Synop., 503; *Alvordius evides.*)

Represented in our Illinois collections only by a few specimens from Rock River. Reported by Dr. Jordan from White River, Indiana, but apparently not collected elsewhere.

18. *Hadropterus aspro*, Cope & Jordan.—Black-sided Darter.

(Bul. II, 39; *Alvordius maculatus:* Synop., 501; *Alvordius aspro.*)

This fine darter is rather common throughout the whole State in large creeks and small rivers, being especially abundant in the Wabash Valley and in the Little Wabash, Saline, and Embarras Rivers. A few specimens were taken also in the Illinois.

19. *Hadropterus phoxocephalus*, Nelson.

(Bul. II, 39; *Alvordius phoxocephalus:* Synop., 501; do.)

This species, described from specimens taken in Central Illinois, has not yet been found in the northern part of the State, although it is decidedly common from the Illinois River southward, including the Wabash Valley. It occurs in our collections only from the larger streams; such as the Fox, Illinois, Saline, and Little Wabash Rivers, and Mackinaw Creek.

Genus 10. Percina, Haldeman.

Log Perches.

20. *Percina caprodes*, Raf.—Log Perch; Rock-fish; Hog-molly; Hog-fish.

(Bul. II, 39; *Percina caprodes, Percina manitou.*)

The largest of its sub-family, and among the most abundant in the northern part of the State. Our collections contain specimens from the borders of Lake Michigan to Cairo and the Wabash Valley. In Northern Illinois it is extremely common in the small lakes and in the streams connected with them, and likewise occurs in other creeks.

Genus 11. Cottogaster, Putnam.

21. *Cottogaster shumardi*, Grd.

(Bul. II, 39; *Imostoma shumardi:* Synop., 498; do.)

Somewhat rare in Illinois, and occurring chiefly in large streams. It has, in fact, been taken by us only from the Rock, Illinois, and Wabash Rivers.

Genus 12. Diplesium, Raf.

22. *Diplesium blennioides*, Raf.—Green-sided Darter.

Found by us only in the Wabash Valley, where it is not rare. Collected from the Little Wabash, at Flora.

Genus 13. Boleosoma, De Kay.

Tessellated Darters.

23. *Boleosoma camurum*, Forbes.

(Synop., 493; *Vaillantia camurum.*)

This little species is wide-spread, but somewhat rare, occurring throughout the State in creeks and ponds, but much more abundantly to the southward.

24. *Boleosoma nigrum*, Raf.—Johnny Darter.

(Bul. II, 400; *Boleosoma olmstedi, Boleosoma maculatum.*)

By far the most abundant and widely distributed of the darters, occurring in almost all waters, though of course far more abundantly in creeks, and preferring rocky shallows. I do not know that it is ever found in foul or muddy situations. It ranges throughout the State from the Galena and Calumet rivers on the north, southward to Union county.

Genus 14. Ammocrypta, Jordan.

25. *Ammocrypta asprella*, Jordan.

(Bul. II, 38; *Pleurolepis asprellus.*)

The only specimens of this species in our collections are the original types, taken in a small bluff stream in Hancock county. It is reported by Dr. Jordan, however, to range from Illinois to Alabama. The creek in which the type occurred is a muddy stream, with occasional reaches of gravelly bottom.

26. *Ammocrypta pellucida*, Baird.—Sand Darter.

(Bul. II, 38; *Pleurolepis pellucidus.*)

The range of this little darter is limited strictly by the character of the streams which it prefers, as it seems to occur only in somewhat swiftly running waters with sandy bottom. We have taken it in the Little Wabash and the Embarras, and some other creeks of the Wabash Valley, but not elsewhere in the State.

Sub-family Centrarchinæ. (The Sun-fishes.)

Genus 15. Micropterus, Lacépéde.

Black Bass.

27. *Micropterus dolomiei*, Lac.—Small-mouthed Black Bass.

(Bul. II, 44; *Micropterus salmoides.*)

Abundant in rivers and larger creeks, but occurring more rarely in lakes, preferring swifter waters than the preceding species. It occurs throughout Illinois, but is relatively rare to the southward. Has been taken by us in the Wabash and some of its larger tributaries, but not elsewhere south of the Illinois River.

28. *Micropterus salmoides*, Lac.—Large-mouthed Black Bass; Oswego Bass; Green Bass; Bayou Bass.

(Bul. II, 44; *Micropterus pallidus.*)

The large-mouthed black bass favors especially lakes, ponds and sluggish waters, but occurs also in rivers and large creeks throughout Illinois. It is the common southern form of black bass, although perhaps, on the whole, no more abundant there than in the northern part of the State.

Genus 16. Lepomis, Raf.

29. *Lepomis gibbosus*, L.—Common Sun-fish; Bream; Pumpkin-seed; Sunny.

(Bul. II, 46; *Eupomotis aureus.*)

By far the most abundant sun-fish in Northern Illinois, where it literally swarms in every lake and pond. It occurs, however, throughout the State, but somewhat rarely southward, its place there being taken by *Chænobryttus gulosus.*

30. *Lepomis notatus*, Agassiz.

(Bul. II, 46; *Eupomotis pallidus.*)

A rather rare species, occurring from the Illinois River southward, chiefly in ponds and larger streams.

31. *Lepomis pallidus*, Mitch.—Blue Sun-fish; Copper-nosed Bream; Dollardee; River Sun-fish.

(Bul. II, 45; *Lepiopomus pallidus.*)

Probably the most abundant of the sun-fishes; its preëminence, however, in this respect being disputed by *Lepomis cyanellus* and *gibbosus.* Its distribution and its haunts are more varied than those of either of these species, as it is almost equally abundant in all parts of the State, and occurs in all waters—in lakes, ponds, rivers,

and smaller streams, from Lake Michigan and the Illinois to small creeks and ponds. It is, on the whole, most abundant in the larger rivers, being in fact, the common sun-fish of the Illinois. Collected by us from Lake to Union county, and in the Wabash Valley.

32. *Lepomis humilis*, Grd.—Red-spotted Sun-fish.

(Bul. II, 45; *Lepiopomus anagallinus.*)

This species, common nowhere, is altogether wanting in Northern Illinois, ranging, according to our collections, from Woodford to Alexander county. It has been collected by us only in creeks.

33. *Lepomis megalotis*, Raf.—Long-eared Sun-fish.

(Bul. II, 46; *Xenotis megalotis, Xenotis inscriptus, Xenotis peltastes.*)

Not especially common within our limits. Most abundant southward. Like most of the sun-fishes, it prefers ponds and creeks to larger waters, although we have taken it occasionally in the Illinois River, and more commonly in the Wabash.

34. *Lepomis ischyrus*, Jordan & Nelson.

(Bul. II, 46; *Lepiopomus ischyrus.*)

Of this rare but well-marked species we have taken only the original type, obtained in the Illinois River; but Mr. Nelson has reported a second specimen, collected in the Calumet, near South Chicago. Its resemblances to *L. pallidus* are so strong that, even if abundant, it would probably be usually overlooked by collectors.

35. *Lepomis macrochirus*, Raf.

Not seen by me. Reported here on the authority of Dr. Jordan, who has a specimen of the species from the Illinois River.

36. *Lepomis garmani*, Forbes.

This species, but just described, has been seen only in the Wabash River and its tributaries, in the vicinity of Phillipstown and Cairo, in White county.

37. *Lepomis symmetricus*, Forbes.

This species, recently described and still rare in collections, has been taken only in ponds and streams in Central and Southern Illinois. It is found chiefly in the southern part of the State, especially in the Wabash Valley, but is occasionally seen in the Illinois River, and has been taken by us in Union county.

38. *Lepomis cyanellus*, Raf.—Red-eye; Blue Spotted Sun-fish.

(Bul. II, 45; *Apomotis cyanellus.*)

This is the most abundant sun-fish of the small prairie streams and pools of Central Illinois, where, in fact, it is almost the only species occurring. It ranges throughout the State, from Cook to Union county, occurring in relatively small numbers in the rivers, but superabundantly in creeks and ponds.

Genus 17. Chænobryttus, Gill.

39. *Chænobryttus gulosus*, C. & V.—Warmouth; Red-eyed Bream.

The sun-fish ranges throughout Illinois, but is far the most abundant southward, where it is one of the commonest species of its family. Indeed, we have not ourselves taken it north of the Illinois River, but Dr. Jordan reports specimens received from Lake Michigan. It is essentially a pond species but occurs also in the larger streams. In the southern part of the State it receives several of the common names (such as Goggle-eye, Red-eye, etc.) appropriated northward to the Rock-bass.

Genus 18. Ambloplites, Raf.

40. *Ambloplites rupestris*, Raf.—Common Rock-bass; Red-eye; Goggle-eye.

Quite common northward, but relatively rare in Southern Illinois, where, indeed, we have not yet taken it. As its southern range, however, is said to extend to Louisiana, it probably occurs occasionally in the southern part of the State, and is reported by fishermen to be common in the rapids of the Wabash. In Northern and Central Illinois it is found in streams of all sizes, from small creeks to the Illinois River, and is also common in the smaller lakes.

Genus 19. Pomoxys, Raf.

Croppies.

41. *Pomoxys sparoides*, Lac. Black Croppie; Calico Bass; Grass Bass; Barfish; Butter Bass.

(Bul. II, 47; *Pomoxys nigromaculatus.*)

Found, like the preceding, throughout Illinois, but commonest to the north, occurring in both lakes and streams; most abundant in the former.

42. *Pomoxys annularis* Raf.—Croppie; Pale Croppie.

Ranges throughout Illinois from Galena to Cairo. Confined principally to the larger streams and their immediate tributaries, it becomes rapidly more abundant as we pass from north to south, finally virtually replacing the preceding species.

Genus 20. Centrarchus, C. & V.

43. *Centrarchus macropterus*, Lac.

(Bul. II, 47; *Centrarchus irideus.*)

This is also a species confined in Illinois to the southern part of the State, where we have taken it in Cache River, in Clear and Drury Creeks, in Great House Creek, near Mt. Carmel, and in various ponds and sloughs in the river bottoms of that region.

Family VI. ELASSOMATIDÆ.

Genus 21. Elassoma, Jordan.

44. *Elassoma zonatum*, Jordan.

A southern species, not collected by us north of St. Francisville, in Lawrence county. Not uncommon in small, muddy pools.

Family VII. APHREDODERIDÆ.

Genus 22. Aphredoderus, Le Sueur.

45. *Aphredoderus sayanus*, Gilliams.—Pirate Perch.

(Bul. II, 48; *Aphododerus isolepis.*)

Throughout the State from the Calumet to Union county and the Wabash but far the most abundant southward. Occurs almost invariably in small streams only, but occasionally taken in the Illinois. One of the commonest species in mud holes in the Mississippi bottoms, in Southern Illinois. Very rare in the central prairie region.

Family VIII. ATHERINIDÆ. (The Silversides.)

Genus 23. Labidesthes, Cope.

46. *Labidesthes sicculus*, Cope.—Brook Silverside.

A very abundant minnow in small streams and lakes in Central and Northern Illinois; also occurs rarely in the Wabash Valley, commonly in Rock River, and occasionally in the Illinois.

Order II. HEMIBRANCHII.

Family IX. GASTEROSTEIDÆ. (The Sticklebacks.)

Genus 24. Gasterosteus, L.

47. *Gasterosteus inconstans*, Kirt.—Brook Stickleback.

Locally common in rivers and small streams in the northern part of the State only. We have not taken it south of Rock River.

Sub-class PHYSOSTOMI.

Order III. APODES.

The Eels.

Family X. Anguillidæ. (The True Eels.)

Genus 25. Anguilla, Thunberg.

48. *Anguilla rostrata*, Le Sueur.—Common Eel.

Not very abundant, but occurring everywhere in streams of large and moderate size, throughout Illinois.

Order IV. HAPLOMI.

Family XI ESOCIDÆ. (The Pikes.)

Genus 26. Esox, L.

49. *Esox nobilior*, Thompson.—Muskallunge.

Found by us only in Lake Michigan.

50. *Esox lucius*, L.—Pike.

Throughout the State, but most abundant northward. Occurs also in Lake Michigan.

51. *Esox vermiculatus*, Le Sueur.—Little Pickerel.

(Bul. II, 53; *Esox salmoneus, Esox cypho.*)

An abundant species north and south, occurring most commonly, perhaps, in weedy lakes, but scarcely less frequent along weedy margins of rivers and smaller streams.

Family XII. UMBRIDÆ. (The Mud Minnows.)

Genus 27. Umbra, Müller.

52. *Umbra limi*, Kirt.—Mud Minnow.

(Bul. II, 52; *Melanura limi.*)

Lakes and muddy ponds in northern and southern Illinois; not taken by us in the central part of the State. Occurs occasionally in running streams, as in Fox River, at McHenry.

Family XIII. CYPRINODONTIDÆ. (The Toothed Minnows.)

Genus 28. Gambusia, Poey.

53. *Gambusia patruelis*, B. & G.

(Bul. II, 52; *Zygonectes melanops:* Synop., 340 and 892; *Zygonectes melanops, Zygonectes inurus.*)

A southern species, not collected by us north of White county. Abundant in ponds and streams in the hill region of Southern Illinois.

A comparison of Illinois specimens of "*melanops*" with *Gambusia patruelis* from North Carolina, leaves no doubt of both generic and specific identity. Our Illinois examples were many of them with living young.

Genus 29. Zygonectes, Agassiz.

Top Minnows.

54. *Zygonectes dispar*, Agassiz.

Throughout the State in small lakes, ponds, and creeks, and occurring rarely in the main stream of the Illinois River. Chiefly a pond species.

55. *Zygonectes notatus*, Raf.—Top Minnow.

Ranges throughout the State, but is far the most abundant southward. Common in small creeks and stagnant pools. Apparently able to live in any water.

Genus 30. Fundulus, Lacépéde.

Killifishes.

56. *Fundulus diaphanus*, Le Sueur.—Spring Minnow.

Abounds in the small lakes and streams of extreme Northern Illinois. Not seen in the central or southern parts of the State. It is somewhat abundant along the weedy margins of the small lakes, and has been found but once or twice by us in streams.

Family XIV. AMBLYOPSIDÆ. (The Blind Fishes.)

Genus 31. Chologaster, Agassiz.

57. *Chologaster papiliferus*, Forbes.

Confined to cave streams and limestone springs of Southern Illinois at their immediate origin in the bluffs. It is unquestionably a subterranean species.

Order V. ISOSPONDYLI.

Family XV. PERCOPSIDÆ. (The Trout Perches.)

Genus 32. Percopsis, Agassiz.

58. *Percopsis guttatus*, Agassiz.—Trout Perch.

A common fish of the Great Lakes. Not often taken from rivers, but obtained by us a few times in the Illinois. Apparently frequents deep water.

Family XVI. SALMONIDÆ. (The Salmon.)

Genus 33. Salvelinus, Richardson.

Trout.

59. *Salvelinus namaycush*, Walb.—Mackinaw Trout; Great Lake Trout.

(Bul. II, 54; *Christivomer namaycush.*)

Occurs only in Lake Michigan.

Genus 34. Coregonus, L.

White Fish.

60. *Coregonus artedi*, Le Sueur.—Lake Herring; Cisco; Michigan Herring.

Extremely abundant in Lake Michigan; occurring also in the small lakes of Indiana and Wisconsin (where it is known as the Cisco) but not in those of Illinois.

61. *Coregonus clupeiformis*, Mitch.—Common White Fish.

Occurring only in Lake Michigan, and there, at present, chiefly in the deeper water outside the limits of this State.

Family XVII. DOROSOMATIDÆ. (The Gizzard Shads.)

Genus 35. Dorosoma, Raf.

62. *Dorosoma cepedianum*, Le Sueur.—Gizzard Shad; Hickory Shad; Skip Jack.

One of the most abundant of our river fishes, and an extremely valuable article of food for the game species. It is confined to the larger rivers and their immediate tributaries, occurring in lakes and ponds only when left by the overflow. It was reported some years ago to have entered Lake Michigan by way of the canal, and to have multiplied there at an extraordinary rate; but I have not lately heard of it in those waters, nor seen it in the catches of the fishermen at South Chicago. We have obtained it from Galena to Cairo and the Wabash Valley, in the Mississippi, Ohio, and Illinois Rivers and their larger and more immediate tributaries, and in ponds near St. Francisville.

Family XVIII. CLUPEIDÆ. (The Herrings.)

Genus 36. Clupea, L.

Herrings.

63. *Clupea chrysochloris*, Raf.—Ohio Shad; Golden Shad.

(Bul. II, 55; *Pomolobus chrysochloris.*)

One of the rarer fishes of our larger rivers, appearing in our collections only from the Illinois, Ohio and Mississippi Rivers. Said to have been introduced, through the canal, into Lake Michigan.

Family XIX. HYODONTIDÆ.

Genus 37. Hyodon, Le Sueur.

Moon Eyes.

64. *Hyodon tergisus*, Le Sueur.—Moon Eye; Toothed Herring.

A moderately common fish in the Illinois, Mississippi, and Ohio Rivers, but not occurring in smaller streams.

65. *Hyodon alosoides*, Raf.

Taken by us only in Galena River, in extreme Northern Illinois.

Order VI. EVENTOGNATHI.

Family XX. CYPRINIDÆ. (The Minnows.)

Genus 38. Notemigonus, Raf.

66. *Notemigonus chrysoleucus*, Mitch.—Golden Shiner; Bream.

In Illinois this species occurs everywhere, in waters of all descriptions—lakes, ponds, creeks, and rivers, although most abundant in small ponds and muddy creeks.

Genus 39. Opsopœodus, Hay.

67. *Opsopœodus emiliæ*, Hay.

(Synop. 247; *Opsopœodus emiliæ*, *Trycherodon megalops*.)

This species has occurred sparingly in our collections throughout the State, and only in running streams or in lakes immediately connected with them. Very abundant in ponds near Mt. Carmel.

Genus 40. Squalius, Bonaparte.

Dace.

68. *Squalius elongatus*, Kirtland.—Red-sided Shiner.

Said by Dr. Jordan to occur in Lake Michigan and in Rock River. Not seen by us from Illinois.

Genus 41. Semotilus, Raf.

69. *Semotilus dissimilis:* Kirtland.—Spotted Shiner.

(Bul. II, 72; *Ceratichthys dissimilis:* Synop. 316; *Ceratichthys sterletus*.)

Has occurred in Illinois only in rivers and in lakes immediately connected with them. It has been collected by us in the Rock, Illinois, and Ohio.

70. *Semotilus amblops*, Raf.—Silver Chub.

(Bul. II, 62; *Ceratichthys amblops:* Synop., 214; do.)

This fish has been obtained by us not rarely in Illinois, chiefly from the Ohio and the Wabash and the larger tributaries of the latter.

71. *Semotilus biguttatus*, Kirt.—Horny Head; River Chub; Jerker.

(Bul. II, 62; *Ceratichthys biguttatus:* Synop., 212; do.)

This species seems limited, in Illinois, to creeks and rivers, and has not occurred in our collections south of the center of the State.

72. *Semotilus corporalis*, Mitch.—Chub; Horned Dace.

Almost wholly confined to small streams, in which it is, in Illinois, the most abundant minnow, commonest in those with muddy bottom; but a few have been obtained in the Illinois River, from lakes in the Illinois bottoms, and from the Little Wabash. It ranges throughout the State.

Genus 42. Platygobio, Gill.

Flat-headed Chubs.

73. *Platygobio pallidus*, Forbes.

A single specimen of this very rare species, obtained in the Ohio River at Cairo, is the only one hitherto taken.

Genus 43. Couesius, Jordan.

74. *Couesius prosthemius*, Cope.

Not in our collection. Specimens from near Evanston, taken in Lake Michigan, are said by Dr. Jordan to be in the National Museum.

Genus 44. Rhinichthys, Agassiz.

75. *Rhinichthys atronasus*, Mitch.—Black-nosed Dace.

(Bul. II, 62 and 63; *Rhinichthys cataractæ, Rhinichthys obtusus, Rhinichthys meleagris:* Synop., 207, 208; *Rhinichthys cataractæ, Rhinichthys atronasus, Rhinichthys obtusus.*)

This is essentially a brook species, delighting especially in swift and rocky streams. We have not found it in Southern Illinois, its localities being confined, in our experince, to the northern half of the State. Its relative rarity here is doubtless due to the infrequent occurrence of suitable streams.

Genus 45. Phenacobius, Cope.

76. *Phenacobius mirabilis*, Gird.

(Bul. II, 61; *Phenacobius scopiferus.*)

Occurs somewhat rarely throughout the State, from Galena to extreme Southern Illinois; almost invariably in small swift streams, or in the rapid, rocky parts of more sluggish creeks.

Genus 46. Ericymba, Cope.

77. *Ericymba buccata*, Cope.

We have found this species only in the sandy stretches of the tributaries of the Wabash, where it is locally very abundant.

Genus 47. Notropis, Raf.

Shiners.

78. *Notropis dinemus*, Raf.—Emerald Minnow.

(Bul. II, 60; *Notropis rubrifrons, Notropis atherinoides:* Synop., 202 and 203; *Minnilus rubellus, Minnilus dinemus, Minnilus rubrifrons.*)

Excessively abundant; far commonest northward, but confined everywhere almost strictly to the larger lakes and rivers. Not a single specimen has occurred in our collections from the smaller lakes in Northeastern Illinois, while the waters of Lake Michigan, a few miles distant, were swarming with them along the shore. Not abundant in the Ohio and northern Mississippi, but rather common in the Illinois. From the smaller tributaries of these streams we have not so much as one of this species. In the Wabash and Saline Rivers, in Southern Illinois.

79. *Notropis macrolepidotus*, Forbes.

A very rare minnow, taken thus far only from the Illinois River.

80. *Notropis atripes*, Jordan.—Red Fin.

(Bul. II, 59; *Lythrurus atripes, Lythrurus diplæmius:* Synop., 197; *Minnilus atripes, Minnilus diplæmius.*)

This species prefers especially small clear streams, in which it is occasionally abundant; but, owing probably to the relative scarcity of such waters in Illinois, it occupies a subordinate place among our cyprinoids. It is commonest in the extremes of the State, occurring but rarely throughout the central prairie region.

81. *Notropis jejunus,* Forbes.

(Bul. II, 60; *Episema jejuna:* Synop., 194; *Minnilus jejunus.*)

A species of the larger rivers, occurring in our collections only from the Ohio, Illinois, Wabash, and Mississippi, or at short distances from these streams, in lakes and tributaries immediately connected with them. Not taken in Northern Illinois.

82. *Notropis megalops,* Raf.—Shiner; Red-fin; Dace.

(Bul II. 57; *Luxilus cornutus:* Synop., 186; *Minnilus cornutus.*)

An extremely abundant fish, perhaps the commonest of the cyprinoids; most common in rivers and creeks and to the northward, but also found in Southern Illinois, and occasionally in lakes and ponds.

83. *Notropis whipplei,* Grd.—Silver-fin.

(Bul. II, 57; *Photogenis analostanus:* Synop., 178 and 179; *Cliola whipplei, Cliola analostana,* etc.: M. V., 294; *Luxilus analostanus.*)

Most abundant in the northern part of Illinois, occurring principally in rivers and large creeks, but likewise rather common southward. It is not unknown from the lakes, but we have found it almost strictly confined to running water.

84. *Notropis lutrensis,* B. & G.

(Bul. II, 57; *Cyprinella forbesi:* Synop., 174 and 175; *Cliola forbesi, Cliola lutrensis,* etc.: M. V., 406; *Cyprinella forbesi.*)

This active little fish delights in the rocky ripples of swift, small streams. It is essentially a southern species, and is much the most abundant to the southward of this State. Along the Mississippi, however, its range extends to extreme Northern Illinois. We found it in great numbers in some creeks in western Hancock county. The small, swift streams running down from the bluffs of the Mississippi River are its favorite haunts. A few specimens have been taken in the Illinois, but it is not known from the lakes, from the Wabash region, or from the small interior streams.

85. *Notropis hudsonius,* Clinton.—Spawn-eater.

(Bul. II, 56; *Alburnops hudsonius, Alburnops storerianus:* Synop., 171; *Cliola hudsonius:* M. V., 290; *Hybobsis hudsonius.*)

Common everywhere to the northward, especially in Lake Michigan and the smaller lakes of Northern Illinois. Collected to our extreme southern limits, but not abundant south of the central part of the State. Next to the lakes we have found it most abundant in the Illinois River, and it has occurred likewise in in smaller streams from the Calumet River, in Chicago, to the larger creeks in Union county.

86. *Notropis phenacobius*, Forbes.

Very rare, at Peoria; not seen elsewhere.

87. *Notropis stramineus*, Cope.—Straw-colored Minnow.

(Bul. II, 57; *Alburnops stramineus:* Synop., 167; *Cliola stramineus:* M. V., 291; *Hybopsis stramineus.*)

This species is rare in our collections, and has occurred only in rivers and small streams in Central and Northern Illinois.

88. *Notropis fretensis*, Cope.

(Bul. II, 57; *Alburnops fretensis:* Synop., 167; *Cliola fretensis:* M. V., 292; *Hybopsis fretensis.*)

Very rare in Illinois; not more than a single specimen among all our cyprinoids certainly belonging to this species.

89. *Notropis anogenus*, Forbes.

Thus far taken only in Fox River, at McHenry, Illinois.

90. *Notropis heterodon*, Cope.

Thus far taken only in Fox River, at McHenry, Illinois.

(Bul. II, 62; *Hemitremia heterodon:* Synop., 163; do.)

This is, within our limits, essentially a species of lakes and larger streams in Northern Illinois, although the form with perfect lateral line has been collected in small numbers from the southern extremity of the State. It is one of the most abundant minnows in the small lakes, northward. It likewise inhabits the Illinois River and the bottom lakes communicating with that stream.

Genus 48. Cliola, Girard.

Silver Fins.

91. *Cliola vigilax*, B. & G.

(Bul. II, 56; *Alburnops tuditanus:* Synop., 165; *Cliola tuditana.*)

Abundant in small streams throughout Illinois. Seems to have been usually confounded with *Pimephales notatus*, to which it bears a strong general resemblance.

Genus 49. Pimephales, Raf.

Fat-heads.

92. *Pimephales notatus*, Raf.—Blunt-nosed Minnow.

(Bul. II, 55 and 56; *Hyborhynchus notatus, Hyborhynchus superciliosus:* Synop., 159 and 160; do.)

One of the commonest of our fishes; extremely abundant in the prairie streams which characterize so large a part of Illinois. It chiefly

affects, however, gravelly spots in muddy streams. It is not common in rivers, but is occasionally taken at the mouths of creeks. It has not been found by us in ponds, but specimens were collected from the small lakes of Illinois.

93. *Pimephales promelas*, Raf.—Fat-head; Black-headed Minnow.

The distribution of this fish in the State is somewhat peculiar. The species is altogether absent, as far as our collections indicate, from the prairie streams of Central Illinois. It is not uncommon in small muddy creeks connected with the larger rivers, and occurs occasionally in these latter streams themselves. We have not taken it in lakes or ponds or similar waters, neither has it occurred to us in Illinois south of the latitude of Alton.

Genus 50. Hybognathus, Agassiz.

94. *Hybognathus nubilus*, Forbes.

(Bul. II, 56; *Alburnops nubilus*; Synop., 167; *Cliola nubila*.)

This minnow has thus far been reported only from Illinois, and has occurred in our collections only from the extreme northern part of the State—from the Rock River and its tributaries.

95. *Hybognathus nuchalis*, Agassiz.—Silvery Minnow.

Almost strictly a river species, being most abundantly represented in our collections from the Illinois, and next from the Wabash, Ohio, and Mississippi. We have not taken it in any lake or pond outside the great river bottoms, and it has occurred but rarely in creeks.

Genus 51. Chrosomus, Raf.

96. *Chrosomus erythrogaster*, Agassiz.—Red-bellied Dace.

This species has occurred sparingly in our collections but from all parts of the State, both in rivers and small streams. We have not taken it, however, from lakes or ponds.

Genus 52. Oxygeneum, Forbes.

97. *Oxygeneum pulverulentum*, Forbes.

Only a single specimen of this genus and species is thus far known, and this was taken from the Illinois River, at Peoria.

Genus 53. Campostoma, Agassiz.

98. *Campostoma anomalum*, Raf.—Stone-roller; Stone-lugger.

This species is very common in small streams throughout the State, from Galena to Cairo, and occurs occasionally in rivers, but rarely or never in lakes or ponds.

Family XXI. CATOSTOMIDÆ. (The Suckers.)

Genus 54. Placopharynx, Cope.

Big-jawed Suckers.

99 *Placopharynx carinatus*, Cope.

This species has not actually occurred in our personal collections from Illinois, but has been received by Dr. Jordan from the Illinois River, and is said by fishermen to be rather common in the Wabash. Its resemblances to Moxostoma are so strong that it would very probably be passed by collectors as belonging to that genus.

Genus 55. Moxostoma, Raf.

Red Horse.

100. *Moxostoma aureolum*, Le S.

Distribution like that of the following species, from which it is, in my opinion, but doubtfully distinct. Less common in Illinois than *macrolepidotum*.

101. *Moxostoma macrolepidotum*, Le Sueur.—Common Red Horse; Mullet; White Sucker; Large-scaled Sucker.

(Bul. II, 63 and 64; *Myxostoma macrolepidotum*, *Myxostoma velatum*.)

Very abundant everywhere in lakes, rivers, and smaller streams. It inhabits Lake Michigan and the smaller lakes in Northern Illinois, and is not less common to the southward. Where the common sucker is not known its name is appropriated to this species, the name of "red horse" being rarely heard in Southern Illinois.

102. *Moxostoma carpio*, Val.—Carp Mullet.

Said by Dr. Jordan to occur in the Great Lakes. Not positively identified by me in Illinois, the common lake mullet of South Chicago not being clearly different, to my mind, from *Moxostoma macrolepidotum*.

Genus 56. Minytrema, Jordan.

Spotted Suckers.

103. *Minytrema melanops*, Raf.—Spotted Mullet; Striped Sucker.

Moderately common in streams throughout the State.

Genus 57. Erimyzon, Jordan.

104. *Erimyzon sucetta*, Lac.—Creek-fish; Chub-sucker.

Everywhere abundant in streams and lakes, ascending creeks in spring. Occurs in our collections from McHenry to Union county.

Genus 58. Catostomus, Le Sueur.

Suckers.

105. *Catostomus nigricans* Le Sueur.—Hog-sucker; Stone-roller; Toter; Crawl-a-bottom; Hammer-head; Stone-lugger; Hog-molly.

Occurs chiefly in streams, and frequents their rapids and shallows, in clear water. Commonest to the northward, probably owing to the clearer and more rocky character of the streams of that part of Illinois. Taken rarely in lakes.

106. *Catostomus teres*, Mitch.—Common Sucker; White Sucker; Brook Sucker; Fine-scaled Sucker.

(Bul. II, 64; *Catostomus commersonii:* Synop. 129; do.)

Abundant northward, occurring rarely in the Illinois as far south as Peoria, and still more rarely in the extreme southern part of the State. Where it is abundant, it inhabits nearly all waters, both lakes and flowing streams. It is common in Lake Michigan.

Genus 59. Cycleptus, Raf.

Black Horse.

107. *Cycleptus elongatus*, Le Sueur.—Black Horse; Gourd-seed Sucker; Missouri Sucker.

Rare in this State, occurring only in the larger rivers. Taken by us only from the Illinois.

Genus 60. Ictiobus, Raf.

Buffalo Fishes.

108. *Ictiobus cyprinus*, Le Sueur.—Carp Sucker; River Carp.

(Bul. II, 65; *Carpiodes velifer, Carpiodes selene, Carpiodes cutisanserinus, Carpiodes difformis, Carpiodes bison, Carpiodes cyprinus, Carpiodes thompsoni, Carpiodes carpio:* Synop., 118, 119, 120; *Carpiodes carpio, Carpiodes thompsoni, Carpiodes bison, Carpiodes cyprinus, Carpiodes difformis.*)

Abundant in the great rivers of the State and their larger tributaries, and also in Lake Michigan and the smaller lakes of Northern Illinois. Extremely common in the lakes and ponds of the river bottoms.

After prolonged study of the so-called species of native carp represented in our collections, I have been compelled to merge them all in one, under the oldest specific name.

109. *Ictiobus bubalus*, Raf.—Small-mouthed Buffalo; Quill-back Buffalo.

(Bul. II, 66; *Bubalichthys cyanellus:* Synop. 116; *Bubalichthys altus:* M. V., 322 and 325; *Bubalichthys altus, Bubalichthys bubalinus.*)

A very abundant fish in the larger streams, and in the bottom lakes; this and the red-mouth being the species commonly shipped under the name of "buffalo fish," from the Illinois and the other larger rivers. They are among the most important commercial fishes in our streams.

110. *Ictiobus urus*, Agassiz.—Big-mouthed Buffalo; Black Buffalo; Mongrel Buffalo.

(Bul. II, 65; *Bubalichthys urus:* M. V., 323; *Ichthyobus cyanellus.*)

Taken by us only in the Illinois River, where it is somewhat rare.

111. *Ictiobus cyprinellus*, C. & V.—Red-mouth Buffalo.

(Bul. II, 65; *Ichthyobus bubalus:* Synop. 114; *Ictiobus bubalus.*)

One of the most abundant edible fishes in the larger rivers and their lakes, ascending the smaller creeks in spring. In the Laboratory collections from the Illinois and its larger tributaries, and from the Ohio and Wabash.

Order VII. NEMATOGNATHI.

Family XXII. SILURIDÆ. (The Cat-Fishes.)

Genus 61. Ictalurus, Raf.

112. *Ictalurus furcatus*, C. & V.

Confined, in our experience, to southern localities, and taken by us only in the Ohio. Not known in the Illinois River, as far as I am aware; known to the southward, at least, as the channel cat or blue cat. I have not taken this species in creeks.

113. *Ictalurus punctatus*, Raf.—Willow Cat; Channel Cat; White Cat.

(Bul. II, 66; *Ichthælurus punctatus, Ichthælurus robustus.*)

Abundant from the larger rivers, reaching a weight of from 20 to 25 pounds.

Found in the deeper water of the Mississippi, Ohio, and Illinois, and occurring likewise in the larger creeks connected with these streams, and occasionally in overflow ponds in the river bottoms.

114. *Ictalurus ponderosus*, Bean.—Great Cat-fish.

One of the gigantic cat-fishes. Described from the Mississippi at St. Louis. Has not occurred in our collections, unless some specimens belong to it which are apparently intermediate between this and *Ictaluris nigricans*. I doubt if it is distinct from the latter.

115. *Ictalurus nigricans*, Le Sueur.—Cat-fish of the Lakes; Great Fork-tail Cat; Mississippi Cat; Florida Cat; Flannel-mouth Cat.

(Bul. II, 66; *Amiurus nigricans:* Synop., 108; *Ictalurus lacustris.*)

One of the gigantic cat-fishes of the Ohio, Illinois, and Mississippi, and of Lake Michigan. Probably the most abundant of the large species.

116. *Ictalurus natalis*, Le Sueur.—Yellow Cat.

(Bul. II, 66; *Amiurus natalis:* Synop., 105; do.)

Occurs everywhere throughout Illinois, but less abundantly than *nebulosus*, and preferring larger streams. It has not been taken by us from ponds and lakes except where these were immediately connected with streams subject to overflow.

117. *Ictalurus nebulosus*, Le Sueur.—Bull-head; Horned Pout; Small Cat-fish.

(*Bul.* II, 66; *Amiurus vulgaris, Amiurus catus, Amiurus melas, Amiurus xanthocephalus:* Synop., 104; *Amiurus xanthocephalus, Amiurus melas, Amiurus catus.*)

Abundant in all waters, frequenting by preference ponds and muddy streams. It occurs, however, in clear lakes and creeks, and has been taken by us occasionally in the larger rivers. It is the everywhere abundant "bull-head," or "bull-pout."

118. *Ictalurus marmoratus*, Holbrook.—Marbled Cat.

(Bul. II, 67; *Amiurus marmoratus:* Synop., 104; do.)

The marbled cat has not occurred in the northern part of the State, but seems to be most abundant in the Illinois and its tributaries. Confined almost wholly to the larger streams and their immediate affluents, in Central and Southern Illinois.

Genus 62. Leptops, Raf.

Mud Cats.

119. *Leptops olivaris*, Raf.—Mud Cat; Yellow Cat.

(Bul. II, 67; *Pelodichthys olivaris.*)

Common in the larger streams. Obtained by us only from the Illinois, Wabash, and Ohio Rivers.

Genus 63. Noturus, Raf.

Stone Cats.

120. *Noturus flavus*, Raf.—Common Stone Cat.

Rather common in Illinois, in creeks of moderate size.

121. *Noturus exilis*, Nelson.

Rare in this State, only two specimens occurring in our collections besides the original type. Creeks in DeKalb, Woodford, and Union counties.

122. *Noturus miurus*, Jordan.

Taken by us only in Southern Illinois, in the Cache and Wabash Rivers.

123. *Noturus gyrinus*, Mitch.

(Bul. II, 68; *Noturus sialis.*)

This species occurs throughout Illinois, but has been confined in our collections mostly to lakes, rivers, and large creeks. It is not by any means restricted to rocky situations, but seems rather to prefer the muddy parts of both the rivers and lakes in which it occurs.

Sub-class HOLOSTEI.

(The Bony Ganoids.)

Order VIII. HALECOMORPHI.

Family XXIII. AMIIDÆ.

Genus 64. Amia, L.

124. *Amia calva*, L.—Mud-fish; Dog-fish; Grindle.

Very abundant throughout the State, in the lakes and larger streams, and also common in ponds in Southern Illinois.

Order IX. GINGLYMODI.

Family XXIV. LEPIDOSTEIDÆ. (The Gar Pikes.)

Genus 65. Litholepis, Raf.

125. *Litholepis tristœchus*, Bloch & Schneider.—Alligator Gar.

(Bul. II, 69; *Litholepis spatula.*)

Not common in Illinois, occurring somewhat rarely in the Ohio and Mississippi rivers, occasionally in the Illinois, and in at least a single instance in the Big Muddy, near Carbondale.

Genus 66. Lepidosteus, Lacépède.

126. *Lepidosteus platystomus*, Raf.—Short-nosed Gar.

One of the most abundant of the larger Illinois fishes, rarely occurring, however, in the smaller streams, and confined chiefly to the larger rivers and the lakes and ponds connected with their waters. It is also taken in Lake Michigan.

127. *Lepidosteus osseus*, L.—Long-nosed Gar; Bill-fish; Common Gar Pike.

Generally abundant in the larger streams throughout the State, and taken by us in the Illinois, Mississippi, and Ohio. Occurs also in the smaller lakes in Northern Illinois.

Sub-class CHONDROSTEI.

Order X. GLANIOSTOMI.

(The Sturgeons.)

Family XXV. ACIPENSERIDÆ.

Genus 67. Scaphirhynchops, Gill.

128. *Scaphirhynchops platyrhynchus*, Raf.—Shovel-nosed Sturgeon; White Sturgeon.

Taken by us somewhat rarely in the Ohio and Mississippi Rivers at Cairo, and in the Illinois at Peoria.

Genus 68. *Acipenser*, L.

129. *Acipenser rubicundus*, Le Sueur.—Lake Sturgeon; Ohio Sturgeon; Black Sturgeon; Stone Sturgeon; Rock Sturgeon.

(Bul. II, 69; *Acipenser maculosus*, *Acipenser rubicundus*.)

Ohio, Mississippi, and Illinois Rivers and Lake Michigan. Reaches, in the last, a weight of a hundred and fifty pounds, or more. The characters vary greatly with age and size.

Order XI. SELACHOSTOMI.

Family XXVI. POLYODONTIDÆ.

Genus 69. Polyodon, Lacépède.

130. *Polyodon spathula*, Wall.—Shovel-fish; Paddle-fish; Spoon-bill Cat; Duck-bill Cat.

(Bul. II, 69; *Polyodon folium*.)

Abundant in the Mississippi and Illinois Rivers, and especially in the ponds and lakes in the bottoms of these streams. Rarely, if ever, ascending smaller streams, and not collected by us in any of the interior lakes. Not known from Lake Michigan. Hausman

Bros., a firm of fishermen at South Chicago, reported the capture of a single specimen of this species in the Calumet River, probably an emigrant by way of the canal.

Class II. MARSIPOBRANCHII.

(The Myzonts.)

Order XII. HYPEROARTIA.

Family XXVII. PETROMYZONTIDÆ. (The Lampreys.)

Genus 70. Ichthyomyzon, Girard.

Silvery Lampreys.

131. *Ichthyomyzon argenteus*, Kirt.—Silvery Lamprey.

(Bul. II, 70; *Ammocœtes argenteus, Ammocœtes hirudo.*)

Collected by us chiefly in the Illinois and Ohio Rivers, attached to shovel-fish, cat-fish, sturgeon, buffalo, and other large species, as taken in the nets of the fishermen.

Genus 71. Ammocœtes, Duméril.

Brook Lampreys.

132 *Ammocœtes niger*, Raf.—Small Black Lamprey.

A small species, which we have found only in small streams in the northern part of the State. Especially abundant in spring, at the spawning season.

SUMMARY AND CONCLUSION.

The especial characteristics of the fish faŭna of the State as distinguished from other zoölogical areas, are the preëminence of the Catostomidæ and the Siluridæ, (the suckers and the cat-fishes,) and of the sunfishes, darters, and minnows, the shovel fish and the various species of gars, and the dog-fish, are likewise among the characteristic features of our fauna, as is also the excessive abundance of the hickory shad.

The limited share of Illinois in Lake Michigan, not extending into water of more than twelve or fifteen fathoms, gives us but a small group of species peculiar to the great lakes; viz., the common white fish, the lake herring, the lake trout, the muskallunge, and the burbot.

Numerical Data.

It will be seen that the fishes of Illinois, as shown by this list, represent 132 species, which are here distributed among 71 genera and 27 families.

A cursory summary, in popular terms, of the number of species by which each leading family is represented, will have its interest to the general reader.

The largest family of our fishes is the perches (Percidæ), including the sunfishes, darters, and true perch. It is represented in our fauna by thirty-eight species and sixteen genera, nearly half of which (eighteen species) are the little darters, while the sunfishes (seventeen species) include most of the remainder. The next largest family is that of the true minnows (Cyprinidæ), represented by thirty-three species, distributed among sixteen genera. There are twelve species, of cat-fishes, four of them the small stone cats, rarely seen by fishermen, and thirteen of the sucker family, four of them buffalo fishes. The sea bass are represented by two species; the sheepshead by one; the fresh water sculpins by one; and the cod-fish family by but one,—the burbot. There are three of the salmon family within our limits, all from the lake; one "blind" fish, one trout perch, four toothed minnows, three species of pike, and one each of the mud minnows, eels, sticklebacks, silversides, pirate perches, and elassomes. The lampreys are represented by two species, the shovel-fish by one, the sturgeons by two, and the gars by three. We have also the one dog-fish, two moon-eyes, one representative of the shad family, and the hickory shad.

DISTRIBUTION OF SPECIES.

A few brief notes respecting the peculiarities of distribution in Illinois will not be without interest. The extraordinary length of this State, from north to south, extending through nearly six degrees of latitude, the southern extremity lying in the southern (Austroriparian) zoölogical region, and the northeastern corner covering a portion of the Great Lake area, gives us an unusual number of species whose range does not extend throughout our territory; some being strictly southern, others as strictly northern, and still others extending their range from the north southward, or from the south northward, without actually reaching the opposite extremity of the State. For the purpose of presenting these facts of distribution in a compact and summary manner, I append lists of species peculiar to the different parts of Illinois, so far as our present knowledge extends, it being taken for granted, of course, that my references to distribution relate only to Illinois.

The first list includes those species which are found in the northern part of the State, and do not occur to the southward, those found, that is, in Illinois north of the Illinois River on the parallel of Ottawa and La Salle.

The second list includes those northern species which extend more or less to the southward, but do not reach the hilly region of Southern Illinois beyond the Big Muddy River, or the valley of the Wabash south of Vincennes.

The third list includes the Southern Illinois species, which extend northward beyond the limits of the region just mentioned, but do not pass the Illinois River to the north beyond La Salle and Ottawa.

The fourth and final list includes those species which are confined to Southern Illinois, as above limited.

Two species, *Notropis macrolepidotus* and *Oxygeneum pulverulentum*, have occurred in the central part of the State, but not in either extremity, but as these are represented only by single specimens each, this fact has no geographical significance.

Another species *Umbra limi*, occurs in the two extremities of the State, but not in the center,—a peculiarity explained by the preference of the species for waters not occurring in Central Illinois.

Northern.

Lota maculosa, Perca americana, Etheostoma eos, Etheostoma lineolatum, Etheostoma zonale, Hadropterus evides, Gasterosteus inconstans, Esox nobilior, Fundulus diaphanus, Salvelinus namaycush, Coregonus artedi, Coregonus clupeiformis, Hyodon alsoides, Squalius elongatus, Couesius prosthemius, Notropis anogenus, Hybognathus nubilus, Ammocœtes niger.

(*Eighteen species.*)

Northern and Central.

Lepomis gibbosus, Lepomis ischyrus, Labidesthes sicculus, Percopsis guttatus, Rhinichthys atronasus, Pimephales promelas, Catostomus teres.

(*Seven species.*)

Southern and Central.

Roccus interruptus, Etheostoma asprigene, Hadropterus phoxocephalus, Lepomis notatus, Lepomis humilis, Lepomis symmetricus, Notropis jejunus, Notropis lutrensis, Placopharynx carinatus, Ictiobus cyprinellus, Ictalurus marmoratus, Litholepis tristœchus, Scaphirhynchops platyrhynchus, Polyodon spathula.

(*Fourteen species.*)

Southern.

Etheostoma fusiforme, Etheostoma flabellare, Diplesium blennioides, Lepomis garmani, Centrarchus macropterus, Elassoma zonatum, Gambusia patruelis, Chologaster papiliferus Platygobio pallidus, Ericymba buccata.

(*Ten species.*)

ECONOMIC RELATIONS.

Our most valuable food fishes are found chiefly in the perch and salmon families: in the former the common perch, the sauger, (or "jack salmon"), the wall-eyed pike, the croppies, and the two black bass; and in the latter, the white-fish, the lake trout, and the lake herring.

But little inferior to the perches are the two principal members of the pike family—the common pike and the muskallunge. Inferior but always salable species are found among the cat-fishes, the sucker family, and the smaller sun-fishes—the largest species of the first and the three buffalo-fishes being more generally and widely marketed than all other species together. Our river carp, a nearly worthless fish, included with the suckers, is not at all to be confounded with the European carp, the two belonging, in fact, to different families. The sturgeon, the sheepshead, the white bass, the striped bass, most of our sun-fishes, and the burbot of the lakes are also generally eaten. Indeed, even the dog-fish and the shovel-fish are esteemed for food in some localities.

Briefly, we may say that of our one hundred and thirty-two native fishes, about twelve are of a superior quality; six, at least,—the white-fish, the lake trout, the two pike perch, and the two black bass,—being among the best of all fresh-water fishes. Eighteen others are of fair and always merchantable quality, and at least a dozen more are really to be classed as edible, although they are not always eaten.

Besides these forty or more directly useful species, nearly all the others are to be considered indirectly valuable, as affording indispensable food to the edible kinds, especially to the best of these, the most highly-prized game fishes. While it may be an open question whether some of the poorer food-fishes on our list do not more harm than good by appropriating food which would otherwise maintain a large number of their betters, the absolutely injurious species—those which inflict injury and render no benefit, direct or indirect, in return—are only the two lampreys and the three gars, the first being parasites and the others predaceous species which are never eaten themselves, either by fishes or by men.

I think that no one, with these facts in mind, can for a moment doubt that the native fish fauna of Illinois is well worthy of careful study and of most solicitous protection. Its value, present and prospective, now little understood, will become more and more evident as the people of the State become better educated in our local natural history, and will, in fact, rapidly appreciate as food becomes more costly, and as the intelligent and well-directed efforts of our State Fish Commission bear their necessary fruit. It is the writer's own opinion that the preservation and improvement of our native fishes, already adapted to our climate, waters, and peculiar conditions of life, afford a far more promising field of practical fish culture than the importation of foreign species, except, perhaps, the European carp.

Champaign, Ill., December 30, 1884.

THE FOOD OF THE SMALLER FRESH-WATER FISHES.

By S. A. Forbes.

In a paper on the food of fishes, published in 1880,* I characterized the food of all the Illinois Acanthopteri, with the exception of the Aphredoderidæ; and in the present article, which is to be regarded as a continuation of that just mentioned, I propose to summarize my observations on all the smaller fishes occurring in the waters of the State, with the exception of the darters (Etheostomatinæ), which were treated in the preceding paper.

The purposes and methods of the investigation upon which the following discussion is based, are so similar to those already described, that they will not need any especial present explanation.

The data for it have been obtained by a minute and careful study of the contents of the alimentary canals of 319 specimens, belonging to twenty-five species, representing twenty-two genera, and seven families; namely, Aphredoderidæ, Cottidæ, Gasterosteidæ, Atherinidæ, Cyprinodontidæ, Umbridæ, and Cyprinidæ.

An additional feature is the description of the structures subsidary to alimentation, given, in this paper, for each genus, in order to furnish a basis for a more exact discussion of the relations of structure to food-habits than I attempted formerly. Under this head I have included the length and complication of the alimentary canal, the character of the pharyngeal structures, the number and development of the gill-rakers, and the presence of any peculiar prehensile apparatus about the mouth.

First giving for each species a brief account of its numbers and distribution throughout the State, I shall add for each genus a description of these alimentary structures, following this by a detailed statement of the observations made upon its food, and closing with a summary of such observations, and a discussion of the correlations of structure to food characters, given sometimes under the genus and sometimes under the special group to which the genus is assigned.

Family APHREDODERIDÆ.

This family is represented by a single peculiar species (*Aphredoderus sayanus*), resembling the sun-fishes in most of its characters, but remarkably distinguished by the fact that the vent, although occupying the normal position in the young, opens in the adult far

*Bulletin No. 3, Ill. State Lab. Nat. Hist., pp. 18-65.

forward under the head, moving gradually to the front with increasing size. This fish is not over three inches in length. It occurs in rivers and smaller streams, as well as in lakes and ponds throughout the State. We have collected it from the Illinois River and various tributaries, as well as from the lakes connected with that stream, and from ponds and creeks throughout Southern Illinois. It has also been taken in the Calumet River near Chicago, and from lakes in that vicinity, but is not known to occur in Lake Michigan. It is said to be nocturnal in its habits, by Dr. C. C. Abbott, who kept specimens in an aquarium for some time.* The same author reports that in confinement it feeds voraciously upon small fishes, especially immature Cyprinidæ; and for this reason he bestowed upon it the name of *pirate perch*, by which it has become generally known among ichthyologists. The observations presently to be detailed will show, however, that his specimens were doubtless forced to feed so largely upon fishes for want of food more natural to them, since in their native haunts fishes make but a small percentage of their ordinary food.

The intestine of this species is short and simple, less than the length of the head and body without the tail, and distinguished only by the character previously mentioned. The gill apparatus is ineffective, the rakers being very short, thick, blunt, and few, and covered with short spinules. The pharyngeal jaws consist of small plates, covered with short, sharp spinulose teeth, similar to those of the sun-fishes. The mouth is large, but not remarkably protractile.

The specimens dissected number nineteen, representing seven different dates and localities, throughout Central and Southern Illinois. Some were taken from small temporary ponds left by the retreating overflow of streams, others from permanent lakes, and still others from creeks and rivers. The food from the different localities varies but little, on the whole, and it is scarcely worth while to discuss the separate collections. That of these nineteen specimens was almost purely animal, traces of a minute flowering plant (Wolffia), and small quantities of filamentous Algæ only being taken by two of the specimens. Fishes were eaten by but two, and were reckoned at two per cent. of the food of the whole. One of these found was recognizable as a cyprinoid, but the other could not be determined. Insects amounted to more than ninety per cent., all of them aquatic, with the exception of a few gnats (Culicidæ) taken by eight of the fishes. Nearly half of the food consisted of larvæ of Chironomus and Corethra. Aquatic coleopterous larvæ were reckoned at eleven per cent., and specimens of Corixa, taken by three of the fishes, at two. A single fish had also eaten Galgulus. A fourth of the food consisted of neuropterous larvæ (Ephemeridæ and Libellulidæ). Crustaceans, though captured by more than half the fishes, made but four per cent. of the food. As far as recognized, this element consisted chiefly of the amphipod, *Allorchestes dentata*, and the common isopod, Asellus. A few specimens of Cypridida were noticed in two of the fishes, and Cyclops and other Copepoda were taken by five. One fish had eaten a Lumbriculus, a species closely allied to the common earthworm.

*Proc. Phil. Acad. Nat. Sci., 1861, p. 95.

A careful comparison was made of the food of specimens of various ages—those, consequently, in which the situation of the vent was widely different—but no differences of food whatever were distinguishable. It is highly probable, consequently, that the explanation of this peculiar character must be sought elsewhere than in the food. With respect to the other relations of food to structure, we have at present only to note the coincidence of fishes and aquatic insects as the principal elements of the food with the large mouth and inferior development of the gill and pharyngeal apparatus, and short and simple intestine.

Family COTTIDÆ.

This curious family, chiefly marine, is represented in the State by several species from Lake Michigan, mostly from its deeper waters, and by a single one recently discovered in our streams.

Potamocottus meridionalis, Gill. Goblin, Blob.

Although this fish has not hitherto been recorded from the State, we have found it abundant in small streams in Southern Illinois, and a single specimen has been sent us from McHenry County, near our northern limits. The first of these situations is in a limestone region, where small caves are not infrequent; but the second is in an area deeply covered by drift, with rock nowhere exposed.

The general appearance of this fish is not unlike that of a catfish, the head being broad and flat, the mouth very large, and the skin smooth. The gill-rakers are few, short, and thick, and of insignificant character; the pharyngeals are similar to those of Aphredoderus, but form thicker and larger plates; the intestine is short and simple, its entire length being less than that of the head and body.

Six specimens of this species, taken in Southern Illinois, had eaten only animal food, about one fourth of which consisted of fishes, one of which was furnished with ctenoid scales. Undetermined aquatic larvæ (thirty-six per cent.) and other insects, were estimated at forty-four per cent. of the food. Crustacea, all belonging to the genus Asellus, eaten by two of the fishes, composed the remaining twenty-nine per cent. The general resemblance of the food of this species to that of Aphredoderus seemingly corresponds to the similar character of their alimentary structures.

Family GASTEROSTEIDÆ.

Of the interesting little stickle backs, two species were studied, only one of which is common in the State.

Eucalia inconstans, Kirt. Black Stickleback.

This fish is abundant in streams and lakes in the northern part of Illinois, but has not been taken by us south of Rock River.

Its mouth is small; the gill-rakers are long and slender (about half as long as the corresponding filaments), but are not unusually numerous: the pharyngeal apparatus is insignificant or wanting; and the intestine is short and simple, not longer than the head and body together.

Four specimens from Rock River, and one from Cedar Lake, in Lake County, had divided their food about equally between plant and animal substances: the former consisting wholly of filamentous Algæ, taken by four of the specimens in quantities to make it certain that they were ingested purposely. The animal food was about equally insects and crustaceans, the former nearly all aquatic larvæ of Diptera (Chironomus being the commonest form), and the latter chiefly Entomostraca, of which Cladocera were the most abundant. One of the specimens had eaten Cypris—some of them *Cypris vidua*. Cyclops was also noticed in three of the fishes, and amounted to three per cent. of the food.

The herbivorous character of this fish seems not to be related to any structural facts; but the occurrence of the large ratio of Entomostraca is at once accounted for by the well-developed gill-rakers, these serving as a straining apparatus by means of which the fishes possessed of it are able to appropriate minuter organisms than would otherwise be available for their food.

Pygosteus pungitius, Lac. Many-Spined Stickleback.

This species has hitherto been found by us only in Lake Michigan, and in Calumet River near its mouth.

But two specimens were dissected, and these had fed wholly on larvæ of Chironomus and Simulium (sixty per cent.), and on Chydorus and other Cladocera (forty per cent.).

With so small an amount of material to illustrate the food of the family, we can only say that it evidently consists chiefly of aquatic larvæ and Entomostraca, together with a considerable percentage of vegetable substances. In the absence of any apparatus for mastication, the latter will doubtless be found to consist of Algæ, as in the cases examined.

Family ATHERINIDÆ.

Labidesthes sicculus, Cope. Silversides.

This elegant little fish, the only local representative of its family, is generally abundant throughout the State, and has been collected by us in a great variety of situations, from the northern lakes to the Wabash River.

It is long and slender, the mouth small and well furnished with teeth, while the throat is destitute of special pharyngeal apparatus. The gill-rakers are unusually well developed, being numerous, slender, finely toothed, and longer than the corresponding filaments of the gills. Taking into account the small size of the fish, and the consequently small diameter of the apertures of the mouth and gills,

it will be seen that it is provided with an especially effective straining apparatus. The intestine is unusually short, the entire alimentary canal measuring considerably less than the length of the body without the head.

The following account of its food is derived from the dissection of twenty-five specimens, obtained from Crystal Lake, Fox River, and Calumet River in Northern Illinois, from Peoria and Mackinaw Creek in the central part of the State, and from Little Fox River in the Wabash Valley. The food of these specimens was purely animal, a little over half consisting of insects, and a little less than half of crustaceans. The larvæ of Chironomus were among the most important elements of the food, standing at thirty per cent. of the whole. The crustaceans were all Entomostraca, and represented a great variety of both Copepoda and Cladocera, although none of the specimens examined happened to have eaten Ostracoda. Among the Cladocera recognized were *Daphnia pulex*, *retrocurva*, and *hyalina*, *Simocephalus americanus*, Bosmina, Chydorus, Pleuroxus, Alona, and Eurycercus; and among the Copepoda were *Cyclops thomasi*, Canthocamptus, Diaptomus, Limnocalanus, and *Epischura lacustris*. Spiders and terrestrial insects, accidently washed or fallen into the water (the latter including Chalcididæ, various Diptera, plant-lice, Tettigonidæ, Thrips, and Podura), amounted to twelve per cent. of the food. The only peculiarities of food corresponding to differences of locality were found among the group from the northern lakes, in which the Chironomus larvæ were present in diminished ratios, while the Cladocera were more abundant.

Family CYPRINODONTIDÆ.

This family consists, in Illinois, of four species, one of Fundulus and three of Zygonectes.* The family is divided into two sections, *carnivorous* and *herbivorous*, by Dr. Günther in his "Introduction to the Study of Fishes." Although our genera both belong to the carnivorous section, it will be seen that they are not by any means strictly confined to animal food, vegetation making about one fifth of their usual nutriment.

Fundulus diaphnus, LeS. Barred Killifish.

This species is very abundant in the northern portion of the State, especially in lakes or in clear and sandy streams, but we have not taken it anywhere in Central or Southern Illinois. Most of our collections were made in the lakes of Lake and McHenry counties.

The intestine is shorter than the body, the gill-rakers are short, obtuse, and few in number, the pharyngeal jaws are of the pavement type, set with fine, sharp teeth, and the mouth is small, but extraordinarily protractile.

Eight specimens were studied, from Crystal and Cedar Lakes. About four fifths of the food consisted of animal substances, the remaining fifth of vegetation. Except a few filamentous Algæ taken

*I do not consider *Fundulus menona*, Jor. and Cope., as distinct.

by one of the specimens, the latter consisted wholly of seeds of various plants fallen into the water. Eighty per cent. of the food of two of the specimens, and twenty per cent. of that of a third consisted of such seeds; ratios evidently too large to have been taken accidently. Two of the specimens had eaten Planorbis, and all had eaten insects, which made about forty per cent. of the food; terrestrial species, including spiders, making twelve per cent. Among the aquatic forms were Chironomus larvæ, Hydrophilidæ, and larvæ of Ephemeridæ, the latter eleven per cent. Crustacea were a fifth of the food, chiefly the abundant amphipod, *Allorchestes dentata*. Cypris and Candona were likewise noticed in considerable quantity (seven per cent.), and a few specimens of various Cladocera occurred.

ZYGONECTES NOTATUS, Raf. TOP MINNOW.

This species ranges in ponds and sluggish streams throughout the State but is abundant southwards. Here it may commonly be seen swimming slowly about in stagnant pools with the head at the surface of the water, as if interested in the phenomena of the weather, or possibly watching for the appearance of terrestrial insects. The alimentary structures are in all respects similar to those of Fundulus, except that the intestine is possibly a little longer, being about equal to the head and body. The only striking peculiarity is the depressed head, with the mouth placed at the upper angle and opening obliquely upwards. This, with the surface swimming habit of the fish has given rise to the supposition that it feeds largely upon surface insects; but I did not find this to be the case, as the seventeen specimens studied contain no example of an insect of this character.

These specimens were taken from a considerable variety of situations throughout Central and Southern Illinois, and at various times of the year. The animal food amounted to about ninety per cent. of the whole. Vegetation, almost wholly filamentous Algæ, was taken by ten of the specimens, but in such quantities by various individuals as to make it certain that its presence was not accidental. In one, for example, the intestine was packed with these Algæ to the exclusion of all other food, and in three others this made more than half the whole. One specimen had also eaten Wolffia. Mollusks (Physa) had been eaten by three, and insects amounted to seventy-three per cent. Spiders and various terrestrial insects made fully a fourth of the food. Philhydrus, taken by three of the specimens was reckoned at eight per cent. Corixa and other aquatic Hemiptera amounted to eleven per cent. and larvæ of Agrion to three. Crustacea was estimated at only six per cent. They included *Crangonyx gracilis*, and various Cladocera, Ostracoda, and Copepoda. Among the Entomostraca recognized were Daphnia, Chydorus, Pleuroxus, Acroperus, Cypris, and Cyclops. Chironomus larvæ were about one per cent., taken by only two of the specimens.

Zygonectes inurus, Jor. and Gilb. Black-eyed Top Minnow.

Zygonectes dispar, Ag. Striped Top Minnow.

The first of these species is peculiar in this State, as far as known, to Southern Illinois, not having been taken by us north of White county. The second ranges throughout.

Six specimens of the first and two of the second were studied. The food characters presented do not differ sufficiently from those of *Zygonectes notatus* to make it worth while to treat them separately, and a summary for the genus will be given instead.

Four fifths of the food of the genus consisted of animal matter, nearly one quarter being Mollusca, including Physa, Planorbis, and *Valvata sincera*. Insects made less than half, and nearly half of these were of terrestrial origin. Chironomus larvæ, usually so abundant in the food of insectivorous minnows, occurred here in only trivial quantity. Specimens of Philhydrus were eaten by three of the fishes. *Corixa alternata* amounted to five per cent. of their food, Agrion larvæ and case worms (Leptoceridæ) to two per cent. Crustaceans were only four per cent. of the whole, partly Amphipoda, but chiefly Entomostraca. The vegetable food (sixteen per cent.) was chiefly Wolffia, taken by five of the specimens from southern lakes. Ten individuals had, however, eaten filamentous Algæ.

Summary.

The only essential difference between these two genera exhibited by the specimens studied, is the much larger ratios of terrestrial insects captured by Zygonectes, this genus eating nearly twice as many as the other. This fact is possibly related to the surface-swimming habit already mentioned, but is more likely due to the smaller bodies of water in which the top minnows occur. Concerning the food of the family as a whole, the salient characters are the presence of a considerable quantity of vegetable food, (about twenty per cent.) the occurrence of fifteen per cent. of Mollusca, the insignificant quantity of Crustacea eaten (four per cent.), and the importance of terrestrial insects as a source of support.

Family UMBRIMDÆ.

Umbra limi, Kirt. Mud Minnow.

This species, the only one of its family in Illinois, is very abundant in muddy ponds and ditches, and has been collected by us from Lake to Union County.

The intestine is short, less than the body in length: the gill-rakers are thick and rather long, about one half the length of the filaments, and the pharyngeal apparatus is wholly insignificant.

Ten specimens were studied, from six localities, all from Southern Illinois but one, which was taken in Calumet River. Vegetable food amounted to forty per cent., chiefly Wolffia, eaten by seven of the

specimens from Southern Illinois lakes. A considerable quantity of unicellular Algæ was also taken by one. Mollusks, eaten by two, were reckoned at five per cent., all Physa. Insects drop to fourteen per cent., chiefly undetermined larvæ. No terrestrial forms were recognized. Corresponding to the greater development of the gill-rakers, we find the Entomostraca assuming greater importance in the food. These were reckoned at ten per cent.; three per cent. additional consisting of *Crangonyx gracilis*.

Family CYPRINIDÆ.

This family includes all the fishes properly known as "minnows," embracing, in fact, by far the larger part of the smaller fishes of the State. Both in number and in variety of species it is much the most important family of fresh-water fishes. It includes, in Illinois, about forty species, nearly or quite one fourth the whole number known to occur in our territory. They occur in all waters from the Mississippi River and Lake Michigan to the smallest streams and ponds; but are much the most abundant in creeks and rivulets. The species differ greatly with respect to their favorite haunts, some affecting the principal lakes and larger rivers, others occurring most commonly in clear and rapid brooks, while still others are most frequent in the sluggish and muddy streams of prairie regions. The principal economic interest of the fishes of this family is due to the well-known fact that they furnish an important part of the food supply of larger species.

But little has hitherto been done upon their food in the United States. In fact, I have seen nothing more accurate or comprehensive than the following general statement made by Prof. Cope, in his paper on the Cyprinidæ of Pennsylvania:*

"These differences of habit are associated with peculiarities of food and of the structure of the digestive system. Few families of vertebrates embrace as great a variety in these respects as the present one. There are carnivorous, insectivorous, and graminivorous genera, which are distinguished as among mammalia; the former by the abbreviation, the last by the elongation of the alimentary canal. In the former the teeth are usually sharp-edged or hooked, in the latter truncate, hammer, or spoon-shaped.

"In the American genera, as far as included in the scope of this essay, the peculiarities of the intestines correspond with the food. In the *Alburnellus rubrifrons*[1] they are but four fifths the length of head and body (excluding caudal fin). In *Hypsilepis kentuckiensis*,[2] *Photogenis leucops*, *Argyreus atronasus*[3] and *nasutus*, *Ericymba buccata*, and *Exoglossum maxillingua*, about seven ninths; the food of the last five species is insects and crustaceans, the last depending largely on Mollusca. In the species of Ceratichthys, Semotilus, and Hybopsis, with *Hypsilepsis cornutus*,[4] fifteen sixteenths to equal the length; the habits insectivorous. The genera with longer intestines are,

* Trans. Amer. Philosophical Society, Vol. 13, New Series, page 353.

[1] Minnilus or Notropis. [2] Photogenis analostanus. [3] Rhinichthys. [4] Luxilus cornutus.

first, Stilbe,* one and two fifths to one and three fourths the length: Chrosomus, Hyborhynchus and Pimephales, two and two fifths to two and two thirds; and Hybogonathus, four times. The intestines in these are generally filled with a soft, dark-colored slime, without remains of insects, but of vegetable origin. In the remarkable genus Campostoma, the canal extends to between eight and nine times the length, and, like that of other vegetable feeders, is usually found occupied by the ingesta for a considerable part of its length."

This statement is in the main correct, as far as it goes, but it will be seen from the following data, and from the discussion of the food of the family, that it is far from the truth with respect to the genus Campostoma and its allies.

If we examine the alimentary structures of the Cyprinidæ, to which reference has been made in describing the food of the preceding families, we shall find these fishes easily divided into at least four tolerably distinct groups, defined by characters drawn from the gill-rakers, the pharyngeal teeth, and the intestines. In all but two of the genera of this paper* the gill-rakers are short and insignificant. The pharyngeal teeth may be either hooked or plain, and with or without grinding surface, while the intestine varies in length from less than that of the body without the head to seven or eight times the length of the head and body together. For convenience sake, I have grouped the genera as follows:—

Group I.—Intestine long. Pharyngeal teeth not or slightly hooked, with grinding surface.

Campostoma, Pimephales, Hyborhynchus, Hybognathus.

Group II.—Intestine rather long. Teeth hooked, with grinding surface.

Notemigonus, Chrosomus.

Group III.—Intestine short. Teeth hooked, with grinding surface.

Hybopsis, Luxilus, Lythrurus, Hemitremia, Platygobio.

Group IV.—Intestine short. Teeth hooked, without grinding surface.

Minnilus, Photogenis, Ericymba, Phenacobius, Semotilus, Ceratichthys, Rhinichthys.

The second group, consisting of Notemigonus and Chrosomus, may be again divided according to the development of the gill-rakers, which are numerous, long and slender in Notemigonus; few, short and insignificant in Chrosomus.

FOOD OF THE YOUNG.

The genera and species of Cyprinidæ are not easily recognized, even in the adult, the characters upon which they are based being often either trivial or extremely variable; and when one has to do with individuals small enough to show the earliest food of the family, it is commonly quite impossible to identify even the genus. In

*Notemigonus.

*I have used here, for convenience sake, the nomenclature of the Catalogue of the Fishes of Illinois, published in our third bulletin.

the few specimens which I have studied, I have not attempted such determination, although I have reason to believe that most of those examined belong to some species of Minnilus.

Their food was so far peculiar, as compared with the young of other families, that I will describe in detail that found by dissecting six specimens under an inch in length. The first of these, three eights of an inch long, taken in Fox river on the 8 h of July, had eaten only a small Chironomus larva and a single example of Bosmina. Two specimens, six tenths of an inch long, captured in August, in a creek in Central Illinois, had derived their food from quite different sources. Filaments of Spirogyra and other filamentous Algæ, cells of Cosmarium and Closterium, and Cymatopleura and other diatoms, and spores of Ustilago, were the vegetable elements, while the head of a Chironomus larva and great numbers of the ciliate infusorian *Euglena viridis*, and a few specimens of *Euglena acus*, represented the animal kingdom. Full half the contents of these intestines consisted of the Protozoa mentioned. A third specimen of the same length, taken from the Illinois river in June, had derived about eight tenths of its food from Bosmina, the remainder consisting of a small Chironomus larva and a minute larval hydrachnid. In a specimen seven tenths of an inch long, taken in Mackinaw creek in August, *Euglena viridis* was the most abundant object, making about six tenths of the food; and *Euglena acus* and a species of Phacus also occurred. Various filamentous Algæ, specimens of Closterium and Cosmarium, and numbers of diatoms, were the remaining elements. In another specimen, taken at the same time and place, about three fourths of an inch in length, fungi and fungus spores amounted to more than half the food, although the same forms of Algæ occurred as before, together with a few examples of *Euglena viridis* and Difflugia. A Chironomus larva, a plant-louse, and some other insect not determined, had also been eaten.

From the above we may conclude that the young Cyprinidæ draw almost indiscriminately, for their food supply, upon Protozoa, Algæ, and Entomostraca, differing in this respect from the young of all the other families which I have studied, with the exception of the Catostomidæ. It is worthy of note, as a suggestive coïncidence at least, that the other families just mentioned which were found to take Entomostraca and Chironomus larvæ as their earliest food, were all possessed of raptatorial teeth on the jaws when very young, whereas in young suckers and Cyprinidæ the mouth is unarmed at all ages.

Group I.

Intestine long. Pharyngeal teeth not hooked, with grinding surface.

Campostoma anomalum, Raf. Stone Lugger.

This very peculiar fish is exceedingly abundant everywhere except in the Great Lakes. I have taken it in streams of all magnitudes, from the Illinois River to the smallest creeks, but have not yet encountered it in Lake Michigan or in stagnant pools. It is commonest, however, in swift creeks of medium size.

It is distinguished from all the other species by the great length of the intestine, which is from six to nine times the length of the body, and is spirally coiled about the air bladder. The gill-rakers are numerous, about twenty in number to each gill, but are very short, scarcely projecting beyond the anterior margin of the arch. They are evidently almost totally inefficient as a straining apparatus.

Of the great number of specimens available for dissection, only nine were studied, since the contents of the intestines were found so uniform in character that it was not deemed worth while to multiply instances. These were from both extremes and also from the center of the State, but were all taken in July, August, and September. The intestine was invariably filled from end to end with a black and slimy matter, which, when examined under the microscope, was found to consist almost wholly of fine mud. When the intestine was emptied and the contents stirred up in alcohol and repeatedly decanted so as to separate the coarser fragments, the organic matter was easily distinguished. It made on an average only about one fourth of the contents of the intestine, the remainder consisting of the finest particles of sand and clay. Not far from one fifth of the whole amount was of vegetable origin, consisting chiefly of filamentous Algæ, mingled with a few diatoms, but comprising occasionally minute fragments of other kinds of vegetation also. The only animal objects noted were occasional Chironomus larvæ and Difflugia. Sometimes the intestine was wholly filled with almost pure mud, in which no organic structures whatever could be detected. Date and locality seemed to make no material difference in the food of this fish, which should evidently be classed as limophagous. The ratios of animal to vegetable food were scarcely different from what one would expect to find in the intestine of a fish which had the habit of swallowing mud rich in organic matter, the greater ratios of vegetation being apparently due to the fact that plants are more abundant in the water than animals.

Pimephales promelas, Raf. Black Head.

This species is generally distributed throughout Central and Northern Illinois, but is not very abundant. We have taken it only in rivers and larger creeks, but have not found it south of Jersey county.

The alimentary canal is two to three times the length of the body, and the gill rakers are fifteen in number and somewhat more prominent than usual, those on the posterior part of the first arch being about one third the length of the corresponding filaments.

Only four specimens were studied, one from the Pecatonica River at Freeport, and three from Otter Creek in Jersey county. With this fish as with the preceding, about three fourths of the contents of the intestine consisted of mud, the remainder being almost wholly insects. These were partly terrestrial species, occurring accidentally in the water, and partly aquatic larvæ of Diptera. The vegetable food of these specimens amounted only to about one per cent., chiefly various unicellular Algæ.

Hybognathus notatus, Raf. Blunt-nosed Minnow.

This extremely abundant minnow occurs in streams and rivers throughout the State, but has not been found by us in ponds. Specimens were taken, however, in the small lakes of Northern Illinois.

The intestine is about two and one half times the length of the head and body. The gill-rakers are few, short, and thick, being about one fifth of the length of the corresponding filaments.

Nine specimens were studied, from all parts of the State, when their food proved to be so uniform in character that further observations were deemed unnecessary. Mud made about eighty per cent. of the contents of the alimentary canal, the remainder consisting of unrecognizable vegetable *débris*, with a few filaments of Algæ. Undeterminable insects occurred in one, and a single specimen of Cypris in another.

Hybognathus nuchalis, Ag. Blunt-jawed Minnow.

This species is likewise generally distributed in rivers, creeks, and ponds, occurring in our collections from Galena to Cairo, and at a great number of points intermediate.

The alimentary canal in this genus is elongate, being about four times the length of the body. The gill-rakers are few and rather short, triangular in form, and about one fourth to one fifth the length of their corresponding filaments.

Eight specimens of this species were dissected, with results in all respects similar to those given for the other members of this group. Filamentous Algæ, diatoms, and a few accidental fungus spores, were the only objects found imbedded in the quantities of mud which filled each intestine.

Summary of the Group.

If we average the results of the four species studied, belonging to this first group, we shall find that about three fourths of the contents of the stomach and intestine consist of soft, black mud, the remaining fourth being derived from both animal and vegetable substances, about three times as much from the latter as from the former. The animal food is chiefly insects, both terrestrial and aquatic, and the vegetation is divided about equally between Algæ and miscellaneous fragments of higher plants. This group, with long intestine and grinding pharyngeals, is consequently to be considered as essentially limophagous. We find this peculiar form of pharyngeal teeth associated only with intestines of this type.

Group. II.

Intestines moderately long; pharyngeal teeth hooked, with grinding surface.

Chrosomus erythrogaster, Raf. Red-bellied Dace.

This species is locally abundant, although not generally common. It occurs in clear streams in the northern part of the State, but has not been taken by us in Central or Southern Illinois.

The length of the fish is contained one and two thirds times in the length of the intestine; the gill-rakers are few and rather short, triangular, acute, and about one fifth the length of the corresponding filaments.

I examined carefully but three specimens of this species, derived from two localities. These were alike in the presence of great quantities of mud, which amounted to about eighty-seven per cent. of the contents of the intestine. The animal food was confined to a trace of Cladocera. The vegetation amounted to thirteen per cent, partly tissues of aquatic plants, with traces of fungi, but chiefly Algæ of various forms, including a little Oscillatoria.

NOTEMIGONUS CHRYSOLEUCUS, Mitch. SHINER.

This extremely abundant minnow, commonly called the shiner, occurs in all waters throughout the State, from the largest rivers to the smallest creeks, and from Lake Michigan to small stagnant ponds.

The intestine is shorter than in any of the preceding species, although still rather long, the head and body being contained one and one third times in its length. The gill-rakers are long, fine, and numerous, about twenty in number on the anterior arch, and fully one third the length of the corresponding filaments, making, therefore, an effective apparatus for the separation of the Entomostraca from the water. As this fish presents a peculiar combination of alimentary structures, and as its food was found unusually various, a larger number of specimens were studied than of any of the species already discussed.

Twenty-five fishes were dissected, from a great variety of situations in all parts of the State, and representing various dates from May to September, inclusive. As the food differed widely according to situation, that of specimens from certain localities being more widely different than the food of different species has usually been found, it will be best to mention the most conspicuous differences depending upon situation.

Specimens taken from the Pecatonica River at Freeport, an extraordinarily muddy stream, noted for the abundance of its mollusks, had eaten no other food than univalve Mollusca, chiefly *Valvata tricarinata* and *Planorbis deflectus*. Another, from the Illinois River at Pekin, had also eaten largely of mollusks, while three taken in Otter Creek, in Jersey county, in almost stagnant reaches of the stream, extremely muddy, and green with Algæ, had filled their intestines with mud, like Campostoma; and still others from ponds near Normal had eaten only Entomostraca, about equally Cladocera and Copepoda. Another specimen from the Illinois River had taken similar food, all Daphnias. One specimen from Nippersink Lake, in the northern part of the State, was full of wild rice (Zizania). Taking all the groups together, and considering the species as a whole, besides the mud already mentioned, about fourteen per cent. of the food consisted of mollusks, and only six per cent. of insects, nearly all of which were of terrestrial species. Crustaceans amounted to fifteen per cent, all Entomostraca. Vegetation stands

at fifty per cent., more than half of it accidental vegetable *débris* partly from aquatic and partly from terrestrial plants. About one fifth of the food consisted of Algæ, half of which was filamentous in character, and the remainder desmids, including Closterium and various diatoms.

The peculiar characters of the alimentary structures of this species are very clearly reflected in this summary of its food, the elongate intestine corresponding to the presence of mud, and the well-developed gill-rakers to the occurrence of Entomostraca. I have not yet noticed any structural peculiarity of the Cyprinidæ related to the habit of feeding upon mollusks.

Summary of the Group.

The two species foregoing agree only in their mud-eating propensity—probably habitual in one and occasional in the other—the first having the longer intestine, and the second the longer gill-rakers. To this last difference we doubtless must trace the different relations of these fishes to Entomostraca.

I find nothing whatever, by comparison of the food of these specimens with those of the preceding group, to show the meaning of the hooked form of the pharyngeal teeth.

Group III.

Intestines short, teeth hooked, with grinding surface.

This group includes Hybopsis, Luxilus, Lythrurus, Hemitremia and Platygobio. My studies were limited to three genera: Hybopsis, Luxilus, and Hemitremia.

Hybopsis hudsonius, Clint. Spawn-eater.

This fine minnow is common everywhere to the northward, especially in Lake Michigan and the other lakes of Northern Illinois, but not abundant south of the central part of the State, although it has been taken at its extreme southern limit. It has never occurred in our collections in the smaller streams, but is confined to the lakes, rivers, and creeks of some magnitude.

The gill-rakers of this minnow are short and few.

Seventeen specimens were studied, from Lake Michigan, Nippersink Lake, and the Illinois River. Mud was found in noticeable quantities only in a single specimen, and there in small amount. About seventy per cent. of the food consisted of animal substances, three per cent. being fishes, taken by two of the minnows. One had also eaten a small bivalve mollusk. Insects made half the food, about one third of them of terrestrial species (Rhynchophora), the remainder being chiefly larvæ of ephemerids. A few Chironomus larvæ and an aquatic hemipter were the only other kinds determined. Crustacea amounted to thirteen per cent., nearly all Ostracoda (*Cypris vidua*), taken by two of the specimens from Chicago. Vegetable food stands at thirty-one per cent., eaten by ten of

the specimens. One third of this consisted of Algæ, chiefly of the filamentous forms, the remainder being miscellaneous fragments of exogenous plants, chiefly evidently aquatic.

Local and individual peculiarities.—The general summaries of the food of so many individuals from so great a variety of situations often disguise interesting and important facts relating to the food resources of the species, since an element taken in large quantity by one or two specimens may figure in the general average in such an insignificant ratio as to lead to the inference that its occurrence is merely accidental. In other words, general averages for a variety of situations will not necessarily indicate all the food resources open to the species. These can only be demonstrated by exhibiting the *peculiarities* of the record as well as its general average characters. For example, the fact that only eleven per cent. of the food of this species consisted of Algæ has a somewhat different aspect when we learn that one of the specimens had eaten nothing else, and that they made three fourths of the food of another. Three specimens had eaten only insects, and these made ninety per cent. or more of the food of three others. Two had eaten nothing but Entomostraca, all the *Cypris vidua* previously mentioned. Vegetable structures made the entire food of four, and ninety per cent or more of the food of three other specimens. Three out of four individuals taken at Nippersink Lake in May had derived from ninety to one hundred per cent. of their food from terrestrial beetles of a single family (Rhynchophora), while ephemerid larvæ occurred in the food of three others in ratios exceeding seventy-five per cent.

Hybopsis stramineus, Cope. Straw-colored Minnow.

This insignificant species has been found by us in rivers and small streams throughout the State.

The gill-rakers were few and short.

Only five specimens were studied, all from rivers in Central Illinois. About three fourths of their food consisted of animal matter, nearly all neuropterous larvæ (fifty-eight per cent.), Ephemeridæ standing at forty-eight per cent., and case worms at ten. Crustacea were ten per cent., all Cyclops except a trace of Canthocamptus. About one fourth of the food was vegetation, chiefly seeds of grasses, occurring, of course, only accidentally in the water. Two had derived from ninety to one hundred per cent. of their food from ephemerid larvæ, and four of the five had eaten vegetation amounting to as much as eighty per cent.

Luxilus cornutus, Raf. Shiner.

This large and fine minnow is probably the commonest fish in Illinois, occurring in lakes and streams of all sizes everywhere throughout our limits.

The gill-rakers are short and few, and of insignificant development, and the intestine is shorter than the head and body.

Twenty-one specimens were studied, from all parts of the State and at various seasons of the year. Animal food amounted to two-thirds of the whole, fourteen per cent. being fishes, eaten, however,

by only one of the specimens. Insects, eaten by nineteen, were reckoned at forty-five per cent., only one fourth of them terrestrial. Gyrinid larvæ, Corixa, and larvæ of *Palingenia bilineata* were among the forms recognized. The crustacean ratio was insignificant, standing at only three per cent., all the abundant amphipod, *Allorchestes dentata*, with the exception of traces of a considerable variety of Entomostraca, including Chydorus, *Acroperus leucocephalus*, and Cypris. One of the water-worms (Lumbriculus) was noticed in a single specimen. Vegetable food was reckoned at thirty-eight per cent., only about one third of it consisting of Algæ, and the rest of accidental fragments, including the seeds, anthers, and pollen of plants, with a little Potamogeton and various forms of fungus spores. One of the commonest of the Algæ was *Cladophora glomerata*,* taken by those from Effingham. The fact has already been noticed that one of the specimens had eaten only fishes. Five had confined themselves to an insect diet, while twelve had derived more than half their food from the vegetable kingdom, one of them eating ninety-five per cent. and another one hundred.

Hemitremia heterodon, Cope. Northern Hemitremia.

This species, extremely abundant in Northern Illinois, has not been taken by us south of the central part of the State. North of Rock River it has been generally found in streams and lakes of all descriptions, from Lake Michigan down.

The gill-rakers are few in number, but thick, triangular, and rather long, those on the posterior part of the arch being from a fourth to a third the length of the filaments. The intestine is contained one and one fourth times in the length of the head and body.

Eighteen specimens were studied, suitably distributed as to time and place. A little mud was found in the stomach of one. Only about one tenth of the food consisted of vegetation, chiefly flowers and seeds. Traces of filamentous Algæ occurred in two of the specimens. Univalve Mollusca were noticed in one, and insects in twelve, amounting to more than a fourth of the entire food. These were chiefly larvæ of Chironomus (twenty per cent.), ephemerid larvæ occurring in but one. Crustacea were reckoned at fifty-eight per cent., all Entomostraca, with the exception of a single *Allorchestes dentata*. About two thirds of these were Cladocera, the remainder being Ostracoda and Copepoda. Rotifers and Protozoa also rarely occurred, the latter including Centropyxis and Difflugia. Five of the specimens had eaten Entomostraca only, and two others ninety per cent. or more. Only two had derived more than half their food from vegetable sources.

It will be seen that the peculiar fact with respect to this species, was the large per cent. of Entomostraca appropriated. I find nothing in the structure of the fish to explain this circumstance, other than the somewhat unusual development of the gill-rakers and the small size of the species. The latter probably had more to do with it

*Kindly determined for me by Rev. Francis Wolle, Bethlehem, Pa.

than anything else. It should be noted, however, that nearly half the specimens were derived from places where Entomostraca were excessively abundant at the time of their capture.

Summary of the Group.

Taking now this group as a whole, we remark, first, the absence of mud mingled with their food, as related to the greatly diminished length of the alimentary canal. We have now also a decided predominance of animal food, which is about three fourths of the entire amount, and note likewise the first occurrence of fishes. Although Mollusca occur in this group, it is in quantity too small to appear in the ratios. Insects make about half the food of all, nine per cent. being terrestrial forms. The larvæ of Neuroptera are by far the most important insect species, and stand at twenty-five per cent. Entomostraca make a fifth of the whole food distributed among all the orders. The vegetation eaten was largely of a purely miscellaneous and incidental character, only about a third of it being derived from aquatic plants.

Group IV.

Intestine short; teeth hooked, without grinding surface.

This group, organized more strictly for predatory purposes than any of the preceding, contains also the largest number of genera, embracing nine of those occurring in Illinois. It was not thought necessary to study all of these, and my dissections were confined to five of them; namely, to Minnilus, Photogenis, Phenacobius, Semotilus, and Ceratichthys.

Minnilus atherinoides, Raf. Emerald Minnow.

This species is everywhere abundant in streams and lakes, but does not occur in ponds. It is most common northward, swarming in summer along the shores of Lake Michigan.

The gill-rakers are short, triangular, and about one fourth the length of the filaments; and the intestine is less than the length of the head and body.

Eighteen specimens were studied, all from the northern half of the State. The food was almost strictly animal, but five per cent. consisting of vegetation, and this chiefly of accidental character, occurring in trivial ratios. Only a single specimen had taken about forty per cent. of its food from filamentous Algæ. A minute fish had been eaten by one of these minnows. Insects made two thirds of the food, nearly two thirds of them being terrestrial. Neuropterous larvæ were the principal aquatic forms, chiefly case-worms and larvæ of ephemerids. The Crustacea (twenty-two per-cent.) were all Entomostraca, about two thirds of them Cladocera, the remainder Copepoda. Among the former Bosmina and Chydorus were recognized, and Diaptomus among the latter.

Six of this species had eaten only insects, and these made ninety per cent. of the food of two others. One had filled itself with the larvæ of *Bibio albipennis*, a terrestrial grub abundant in early spring. Three from Peoria Lake, captured in October, had eaten Cladocera only, nearly all a single species, *Bosmina longirostris*.

Photogenis analostanus, Grd. Silver Fin.

Excessively abundant in streams of all sizes.

The gill-rakers are short, triangular, about one fourth of the length of the filaments. The intestine is shorter than the head and body.

Thirty-three specimens of this species were examined. Two thirds of the food was insects, seven per cent. fishes, taken by three individuals, and one per cent. spiders, bringing the ratio of animal food up to seventy-one per cent. Besides these, a Limnæa was eaten by one, and traces of Cladocera and Copepoda occur in three. Nearly half the insects were terrestrial, Corixa and neuropterous larvæ being the most important aquatic forms. The vegetable food (twenty-nine per cent.) was nearly all of terrestrial origin, about one third consisting of Algæ, both filamentous and unicellular, including Spirogyra and Gloeocystis. Seeds, anthers, and pollen of plants, and fragments of grass-like vegetation were noticed.

Eight of the specimens had taken only insects, and in two others these amounted to ninety-five per cent. Two had fed upon terrestrial species only. Corixa made ninety-five per cent. of the food of one. One had fed solely upon filamentous Algæ, and ninety per cent. or more of the food of three others consisted of vegetable structures in general.

Phenacobius scopiferus, Cope.

This species occurs not very abundantly throughout the State, from Galena to extreme Southern Illinois. It has been taken by us almost invariably in swift and shallow streams.

The mouth is small and inferior, provided with fleshy lips somewhat resembling a sucker's in form. The gill-rakers and pharyngeal teeth are as usual in this group, and the intestine is contained once and a half in the length of the head and body.

The nine specimens studied were from five localities, distributed from Galena to Union county. The food was almost purely insects, only two per cent. being unrecognized vegetation. Seventy-six per cent. consisted solely of Chironomus larvæ, and six per cent. of case-worms. Adult chironomids, taken by two of the specimens, amounted to two per cent. A few Cyclops found in a single specimen were the only Crustacea eaten by these fishes.

The peculiar character of this food, almost precisely that of a darter, is evidently related to the habitat of the fish.*

*For a discussion of this matter, see Bulletin 3 of this series, p. 25.

Semotilus corporalis, Mitch. Chub.

This is a widely distributed and very abundant fish, perhaps the commonest species in the small creeks; but is less abundant in lakes and ponds.

The head and mouth are unusually large for a minnow; the intestine is six sevenths the length of the head and body; and the gill-rakers are of the usual form.

Twenty-two specimens, from widely separated localities, give a ratio of seventy-six per cent. of animal food, four per cent. being fishes (partly Cyprinidæ), thirteen per cent. vegetation, and three per cent. worms. Insects make a little over half the whole, about one half of them terrestrial. No Chironomus larvæ were found in the food of these fishes. Of neuropterous larvæ only a trace occurred, aquatic Coleoptera were noted in two, and Corixa in one. Grasshoppers (Acrididæ) made ten per cent. of the whole, and were eaten by three of the specimens. Five had taken crawfishes, which made twelve per cent. of the entire food. No Entomostraca were noted, with the exception of one per cent. of Cyclops occurring in two of the specimens. Numerous examples of Gordius were found in two, and were reckoned at three per cent. of the food.* The vegetable food (twenty-four per cent.) was half Algæ, the remainder miscellaneous vegetable *débris*.

Eight had eaten only insects, two having filled themselves with grasshoppers. Three from a prairie stream near Normal had taken only crawfishes, while of four specimens captured in McLean county in July, filamentous Algæ composed ninety-four per cent. of the food.

Ceratichthys biguttatus, Kirt. Horned Chub.

This species is everywhere abundant northward, chiefly, like Semotilus, in the smaller streams, but preferring swifter waters. We have not taken it, however, south of the center of the State.

It differs from the preceding members of the group by the greater length of its alimentary canal, which considerably exceeds the head and body, the latter being contained in the intestine about one and one fourth times. The gill-rakers are not peculiar.

Thirteen specimens from Northern and Central Illinois had derived less than half their food from the animal kingdom. Only about one fourth of it consisted of insects, largely case-worms and other neuropterous larvæ, another fourth being Crustaceans (crawfishes), eaten, however, by only two of the specimens. The vegetable food (fifty-four per cent.) was about equally divided between filamentous Algæ and seeds of Setaria and other grass-like plants.

Notwithstanding the small ratio of insects figured out, it is worthy of note that two specimens out of four captured in a creek in September had eaten only insects, chiefly case-worms, while these composed ninety-five per cent. of the food of another. As the intestines of these fishes contained a considerable quantity of gravel,

*These were not from the same specimens as those containing the grasshoppers.

it is evident that they had fed upon the bottom in rather swift water. On the other hand, two specimens had derived all their food from vegetable sources, and three others had eaten eighty per cent. or more of vegetation. The extraordinary amount of vegetation in the food of this fish is possibly related to the increased length of the alimentary canal.

SUMMARY FOR THE GROUP.

Ninety-five specimens of Group IV examined, representing five genera, had derived about three fourths of their food from the animal kingdom, three per cent. of it being fishes, sixty-one per cent. insects, one per cent. Arachnida, and eleven per cent. Crustacea. One third of the insects and spiders belong to terrestrial species. Chironomus larvæ are among the most important aquatic elements, amounting to sixteen per cent., neuropterous larvæ coming next (eleven per cent.). About two thirds of the crustaceans were crawfishes, the remainder being Cladocera and Copepoda. The vegetation (nearly one fourth of the entire food) was chiefly of miscellaneous origin, nine per cent. only being recognizable as of aquatic forms. This was almost entirely filamentous Algæ.

Concerning this fourth group it may consequently be said, roughly, that the food consists of insects, crustaceans, and vegetable *débris*, about two thirds of it the first, one fourth of it the last and one tenth the other.

SUMMARY FOR THE FAMILY.

If we regard the two hundred and fourteen specimens of fourteen genera which I have studied as fairly representative of the family Cyprinidæ, and strike a separate balance of their food, we shall find that about thirty per cent. of the contents of the alimentary canal consists of mud; one half of it, or a little less, is animal matter, and that vegetation amounts to about one fourth. Insects make one third of the entire food, about ten per cent. being terrestrial species, eight per cent. Chironomus larvæ, and an equal number larvæ of Neuroptera. Of aquatic Coleoptera we have only a trace, and of aquatic Hemiptera (Corixa) but one per cent. Crustacea stand at ten per cent., nearly half of them Cladocera, Entomostraca as a whole amounting to about three fourths of the crustacean ratio. Fishes are only two per cent., and mollusks less than one. Nearly half the vegetable food consists of Algæ (chiefly filamentous forms), the remainder being miscellaneous structures, derived from a great variety of plants, mostly terrestrial.

Summing up, in a word, the characteristics of the food of the family as thus indicated, we may say that about one half of it consists of animal substances, one third being insects, and one third of these of terrestrial species, and ten per cent. being crustaceans; that one fourth consists of vegetation, about equally aquatic and terrestrial, and that the remainder is mud, probably containing more or less fluid organic matter.

COMPARISON OF THE GROUPS.

It will be remembered that the groups were based upon differences in the structures relating to the appropriation and mastication of food. It is consequently from a comparison of the ratios of these groups that we shall derive the most interesting facts relating to the correspondence of food and structure. The most conspicuous result is the great preponderance of mud in the intestines of the fishes of the first group, characterized by an extraordinarily elongate intestine, and by pharyngeal teeth destitute of hooks and provided with a broad grinding surface. Here, as already noted, mud, sand, and gravel amounted to about three fourths of the matter ingested, while in the third and fourth groups only trivial and accidental quantities occurred. In the second group, on the other hand, with intestines intermediate in length, mud was still abundant, but much less so than in the first, averaging less than half the whole. If we exclude this indigestible matter, however, we shall find the first group still further distinguished by the predominance of vegetation as compared with animal matter, the latter being only about one third the former, while in Groups III and IV, on the other hand, vegetation amounts to about one third the animal food. The groups last mentioned, distinguished from each other as they are, only by the presence of a masticatory surface on the pharyngeal teeth in the first, and its absence in the second, differ scarcely at all in their general food characters, and this structural feature seems therefore to be of little significance. In both the animal ratio amounts to seventy-five per cent., and vegetation stands in each at twenty-five; while insects are respectively fifty and sixty-one. It is true that we find neuropterous larvæ greatly predominant in the first group, making one fourth of their food, and Chironomus larvæ in the second amounting to sixteen per cent. The second of these facts we find upon analysis to be evidently due to Phenacobius, by which genus nearly all the Chironomus larvæ were taken; and this, as already shown, is explained not by any structural feature, but by its peculiar habitat; and when we note that aquatic larvæ together amount in Group III to twenty-five per cent., and in Group IV to twenty-seven, we see that the significance of the difference mentioned disappears. A similar explanation is found of the difference in the ratios of Entomostraca,—that of the first group amounting to twenty per cent. and that of the second only to four. An examination of the tables shows that this predominance in the group first mentioned is nearly all traceable to Hemitremia, a very small fish with rather elongate gill-rakers.

The importance of these gill structures is still more clearly indicated, as already noticed, by the difference between Notemigonus and Chrosomus of the second group, and clearly far outweighs the structure of the teeth as an indication of the food habits of the fish.

The general conclusions reached may be thus briefly stated: An extraordinarily elongate intestine indicates the limophagous habit, rather than an especial preference for vegetable food. The

length or number of the gill-rakers has much to do with the abundance of Entomostraca and other minute animal forms in the food of the fish, while the presence or absence of the terminal hook or the masticatory surface to the pharyngeal teeth is not thus far shown to have any sensible influence upon the general average of the food. Finally, a species may depart widely in food characters from those more nearly allied to it in structure, if its favorite haunts are peculiar.

TABLE OF FOOD: APHREDODERIDÆ TO UMBRIDÆ.

	Aphredoderus sayanus	Potamocottus meridionalis	Gasterosteidæ	Labidesthes sicculus	Fundulus diaphanus	Zygonectes notatus	Zygonectes furcatus	Zygonectes dispar	Summary of Cyprinodontidæ	Umbra limi
No. of Specimens examined	19	6	7	25	8	17	6	2	33	9

KINDS OF FOOD.	NUMBER OF SPECIMENS AND RATIOS IN WHICH EACH ELEMENT OF FOOD WAS FOUND.									
ANIMAL FOOD	.99	1.00	.75	1.00	.81	.90	.83	1.00	.70	.50
I. Fishes	.02	.27		.01		*			*	
II. Mollusca				.01	.02	.03	.42	*	.15	.05
Univalves					.02	.03	.42	*	.15	.05
Bivalves				.01						
III. Insects	.91	.44	.44	.54	.37	.73	.18	*	.43	.14
Aquatic larvæ	.08	.36								
1. *Hymenoptera*				.01	.04	.08	.02		.05	
2. *Diptera*	.45	.01	.43	.46	.14	.21	.07	*	.14	*
Terrestrial				.30	.01	.02			.01	
Brachycera				.04		.01			.01	
Chironomidæ				.25	.01	.01			*	
Aquatic (larvæ)	.43		.37	.05	.02	*			.01	
Culicidæ	†					*			*	
Corethra	.07									
Chironomus	.36		.17	.05	.02				.01	
Simulium			.20							
3. *Coleoptera*	.11				.06	.17			.08	
Terrestrial	.11									
Aquatic larvæ					.03	.08			.04	
Hydrophilidæ						.08			.03	
Philhydrus					.03	.04			.02	
4. *Hemiptera*	.02			.01	.02	.17	.08	*	.09	.03
Terrestrial				.01	.02	.05	.05		.04	
Aquatic						.11	.01	*	.04	
Corixa	.02					.10		*	.03	
5. *Neuroptera* (larvæ)	.25			.06	.11	.03	.01		.05	
Ephemeridæ	.14				.11				.04	
Palingenia	.07									
Odonata				.06		.03			.01	
Agrion				.01		.03			.01	
Libellulidæ	.11									
Leptoceridæ							.01		*	
6. *Thysanura* (Podura)										
IV. Arachnida			.01	.03	.02	.03			.02	
Terrestrial			.01	.03	.02	.03			.02	
Hydrachnidæ									*	
V. Crustacea	.04	.29	.30	.40	.21	.06	.03	*	.10	.13
1. *Amphipoda*	.03				.13	*	.02		.05	.03
2. *Isopoda* (Asellus)	.01	.29								
3. *Cladocera*			.28	.24	.01	.02	*		.01	.03
Daphniidæ			.14	.23		.01				
Lyncidæ			.14	.01	.01	*				
4. *Ostracoda*	†		.01		.07	.02			.03	.04
5. *Copepoda*	*		.01	.16		.02	.01		.01	
VI. Vermes (*Chætopoda*	.02									
VII. Protozoa							†		†	
VEGETABLE FOOD	.01		.25		.19	.10	.37		.17	.41
Seeds					.18	.01			.05	
1. *Endogens*	†						.34		.09	.33
2. *Algæ*	.01		.25		.01	.09	.03		.03	.08

Table of Food of Cyprinidæ.

	Campostoma anomalum	Pimephales promelas	Hyborhynchus notatus	Hybognathus nuchalis	Summary of Group I.	Notemigonus chrysoleucas	Chrosomus erythrogaster	Summary of Group II.	Hybopsis hudsonius	Hybopsis stramineus	Luxilus cornutus	Hemitremia heterodon	Summary of Group III.	Minnilus atherinoides	Photogenis analostanus	Phenacobius scopiferus	Semotilus corporalis	Ceratichthys biguttatus	Summary of Group IV.	Summary of Cyprinidæ
No. of Specimens	9	4	9	8	30	25	3	28	17	5	21	18	61	18	33	9	22	13	95	....

KINDS OF FOOD.	NUMBER OF SPECIMENS AND RATIOS IN WHICH EACH ELEMENT OF FOOD WAS FOUND																			
ANIMAL FOOD	....	.27	....	....	.07	.35	†	.18	.69	.76	.62	.87	.73	.95	.71	.98	.76	.46	.77	.48
I. Fishes	....	....	....	....	....	....	....	....	.03	....	.14	....	.04	.03	....	....	.04	....	....	.02
II. Mollusca	....	....	....	....	....	.14	....	.07	.01	....	....	†	†	....	†	....	....	....	....	....
Univalves	....	....	....	....	....	.14	....	.07	....	....	....	†	†	....	†	....	....	....	....	....
Bivalves	....	....	....	....	....	....	....	....	.01	....	....	....	†	....	....	....	....	....	....	....
III. Insects	†	.25	†	....	.06	.06	....	.03	.51	.66	.45	.29	.48	.67	.63	.98	.56	.24	.61	.34
Terrestrial	....	....	....	....	....	....	....	....	....	....	.03	....	.01	.02	*	....	....	....	.01	.10
Aquatic	....	....	....	....	....	....	....	....	....	....	.02	†	†	....	.01	....	.12	.03	.03	....
1 *Hymenoptera*	....	....	....	....	....	....	....	....	....	....	.02	....	.01	.05	.04	....	.10	....	.04	....
2 *Lepidoptera*	....	.15	....	....	.04	.03	....	.01	....	....	†	....	†	.01	.05	....	.01	.03	.02	....
3. *Diptera*	†	.10	....	....	.02	†	....	†	.03	.05	.04	.24	.09	.14	.26	.78	.08	.01	.25	....
Terrestrial	....	....	....	....	....	....	....	....	....	....	....	.01	†	.11	.18	.02	†	....	.06	....
Chironomidæ	....	....	....	....	....	....	....	....	....	....	....	.01	†	....	....	.02	....	....	....	....
Aquatic (larvæ)	†	....	....	....	†	†	....	†	.03	....	....	.20	.06	.02	.06	.76	....	.01	.17	....
Chironomus	†	....	....	....	†	†	....	†	.03	....	....	.20	.06	....	.03	.76	....	.01	.16	.08
Simulium	....	....	....	....	....	....	....	....	....	....	....	....	....	.02	.02	....	....	....	....	....
4 *Coleoptera*	....	....	....	....	....	.02	....	.01	.18	....	.06	....	.06	.13	.02	....	.10	.01	.05	....
Terrestrial	....	....	....	....	....	.02	....	.01	.18	....	.05	....	.06	.13	.01	....	.05	.01	.04	....
Carabidæ	....	....	....	....	....	....	....	....	....	....	....	....	....	.01	....	....	.01	....	.01	....
Aquatic	....	....	....	....	....	....	....	....	....	....	.01	....	†	....	....	....	.03	....	.01	†
Haliplus	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.02	....	.01	....
Gyrinidæ (larvæ)	....	....	....	....	....	....	....	....	....	....	.01	....	†	....	....	....	....	....	†	....
Hydrophilidæ	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.01	....	....	....
5. *Hemiptera*	....	....	....	....	....	.01	....	.01	.01	....	.02	....	†	.11	.10	....	.03	....	.05	....
Terrestrial	....	....	....	....	....	....	....	....	....	....	†	....	†	.05	.01	....	....	....	.01	....
Aquatic	....	....	....	....	....	.01	....	.01	.01	....	.01	....	.01	.05	.08	....	.03	....	.03	.01
Corixa	....	....	....	....	....	....	....	....	....	....	.01	....	.01	....	.08	....	.03	....	.02	....
6 *Orthoptera*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.12	....	.02	....
7 *Neuroptera*	....	....	....	....	....	....	....	....	.28	.58	.10	.03	.25	.17	.10	.14	....	.16	.11	.08

Table of Food of Cyprinidæ—Continued.

	Campostoma anomalum	Pimephales promelas	Hybognathus nuchalis	Summary of Group I	Notemigonus chrysoleucas	Chrosomus erythrogaster	Summary of Group II	Hybopsis hudsonius	Hybopsis storerianus	Luxilus cornutus	Hemitremia heterodon	Summary of Group III	Minilus atherinoides	Photogenis analostanus	Pteronotus scopiferus	Semotilus corporalis	Ceratichthys biguttatus	Summary of Group IV	Summary of Cyprinidæ
No. of Specimens	9	4	9	8	30	25	3	28	17	5	21	18	61	18	33	9	24	13	95	....

KINDS OF FOOD. NUMBER OF SPECIMENS AND RATIOS IN WHICH EACH ELEMENT OF FOOD WAS FOUND

Larvæ											.04	....	.01	....	.01	.08	....	.03	.02	
Pupæ															.03				.01	
Ephemeridæ									.28	.18	.06	.03	.21	.10	.01			.01	.02	....
Phryganeidæ										.10			.03	.07	.05	.06		.12	.06	....
IV. Arachnida														.02	.01				.01	
V. Crustacea		†		†	.15	†	.08	.13	.10	.03	.58	.21	.22	†	†		.13	.22	.11	.10
1. *Decapoda* (Crawfish)																	.12	.22	.07	
2. *Amphipoda*											.03	.01	.01							
3. *Cladocera*					.10	†	.05	.01		†	.36	.09	.15	†					.03	.04
Sididæ (Daphnellæ)											.01									
Daphnidæ					.10		.05			†				.12	†				.02	
Lynceidæ					*		*	.01		†	.35	.09	†	†					†	
4. *Ostracoda*		†		†	*		*	.12		†	.04	.01								.01
5. *Copepoda*					.05		.03		.10		.17	.07	.07	†	†	.01		.01	.01	.02
VI. Vermes		.02			.01						†	†							.01	
Lumbricidæ																				
Naidæ		.02			.01															
Gordius																	.03		.01	
Rotifera																				
VII. Protozoa	†				†						†	†								
Vegetable food	.20	.01	.20	.25	.18	.50	.13	.31	.31	.24	.38	.11	.26	.05	.29	.02	.21	.54	.23	.23
Miscellaneous	.02	†	.15		.09	.21	.02	.11	.10	.01	.05	.03	.05	.01	.06	.02	.10	.02	.01	
1. *Fungi*																				
2. *Algæ*	.18	.01	.05	.25	.09	.19	.09	.14	.11	....	.12	.01	.05	.01	.09	....	.12	.28	.09	.10
Mud and gravel	.75	.72	.80	.75	.75	.15	.87	.51	†	....	....	.02	.01	....	....	†	....	....	†	.29

THE FIRST FOOD OF THE COMMON WHITE-FISH.

(Coregonus clupeiformis, Mitch.)

By S. A. Forbes.[1]

In a very large lake the conditions of life are remarkably uniform. The volume of water remains, of course, nearly constant from season to season and from year to year, and the extremes of summer heat and winter cold have but a moderate effect upon the temperature of the lake as a whole. Consequently both plant and animal life exhibit there a regularity and stability which are in remarkable contrast to their fluctuations in smaller bodies of water and on the surrounding land. Not only do the relative numbers of individuals in the various species remain about the same, but the absolute number of each must necessarily change but little, as a rule.

Such a state of affairs is eminently favorable to an exact and *economical* balance of supply and demand, of income and expenditure, of multiplication and destruction, among the inhabitants of the lake. Here, every species of animal, whether predaceous or vegetarian, must find, in the surplus products of growth and reproduction among the species upon which it depends for food, a far more constant and unvarying supply for its needs than elsewhere; and the species fed upon must be subject to a far more regular drain upon their surplus numbers or unessential structures. Where there is little fluctuation there is little waste.

A system of life like this, running on with relatively even tenor for centuries, must of course be much less *flexible* than one where wide and violent fluctuation and continual readjustment are the rule; and a species in any way deeply affected will here have within itself far less recuperative power than one which has been forced again and again—each year, perhaps to rally against the most destructive attacks as the price of its continued existence. Disturbances of the natural balance of life, of the primitive and spontaneous system of reaction by which the different groups of organisms are related, will therefore be unusually serious and lasting; and where such disturbances result from human interference, as by the yearly capture of large numbers of any important fish, it is especially desirable that artificial means of compensation be taken to restore the disturbed balance as nearly as possible. Excessive loss will be made good by natural reactions far more slowly than if it occurred to a pond or river species, accustomed, as most of the latter are, to fill up rapidly enormous gaps in their numbers.

On the other hand, to multiply *unduly* by artificial measures any species naturally abundant in such a lake, will have scarcely a less disturbing influence than to *diminish* its numbers in the same ratio. The relatively nice balance between the demand for food and food supply which here naturally obtains, is such that an extraordinary increase in a species must soon react to diminish greatly its food resources—a fact which will then take effect on the species itself, reducing it below its natural original level; and if both excessive capture and excessive multiplication go on side by side, we shall have this result finally aggravated to an extreme degree.

As fishes are caught before the end of their natural lives, but planted by the fish culturist when young, it is evidently the food of the young which will be first and most seriously affected by overproduction. Only a part of the adults, perhaps a small fraction, will live a life of ordinary natural length, many being captured before they have attained even the average size; but a far greater number, perhaps nearly every one, must survive the earliest period and must consequently draw most heavily upon the earliest food resources of the species when these differ from those of the adult.

The above considerations are brought forward here to show the especial importance to us, of a study of the system of natural interactions by which the animals of our great lakes affect each other, if we would avoid the necessarily injurious consequences of our own interference with the natural order there obtaining, and above all to show the extraordinary value of a knowledge of the food habits and food capital of the *young*. They apply perhaps more forcibly to the white-fish than to any other species in the lakes; because this is for several reasons the most important purely fresh-water fish of the great lake region, and proves to have a distinctly different food when young from that upon which it is dependent later.

According to the recent census report,* more than twenty-one million pounds of white-fish were taken in the Great Lakes in 1879, valued at over three quarters of a million of dollars, and representing nearly half the total sum derived from the lake fisheries of all kinds. These fisheries employ over five thousand men, and a fixed capital of one million three hundred and forty-six thousand dollars. When we reflect that this enormous drain upon the number of the species is necessarily, to a considerable extent, an addition to the natural tax levied upon it by its enemies other than man, we see that there must be an artificial supply provided, or the fisheries will gradually fail.

The importance of the knowledge of the food of so valuable a species needs no demonstration, especially when we consider that, consistently with what has been said above, it may not be difficult to overdo the work of propagation.

If the white-fish were to be multiplied indefinitely, without any attention to the character or abundance of its food supply, it would soon reach such a number that it must infringe upon its own food capital, diminish the average number of the animals upon

* Census Bulletin No. 261, Sept. 1, 1881.

which it depends for subsistence, and so finally indirectly cripple itself. Then the money and labor expended in its culture would be worse than the first. An acquaintance with the food of the young is especially necessary, because they are planted by the fish-culturist when, having already absorbed the egg-sac (the supply of food by which they are under natural conditions supported until they have time to scatter themselves widely through the water), they are in a peculiarly helpless condition, unable to wander far in search of subsistence, and compelled to find food speedily or perish. One would say, therefore, that their alimentary resources and habits should be well and thoroughly known, that the range, period, and abundance of the organisms upon which they feed should be carefully determined, and that each locality where the young are deposited should be closely searched for the purpose of ascertaining whether their food species occur there at the time in sufficient quantity to prevent immediate starvation.

Previous studies of the food of young fishes of a variety of families, reported in the third Bulletin of this series, had showed that, with exceptions presently to be mentioned, the earliest food of all families studied consisted almost wholly of various species of Entomostraca and some equally minute and delicate dipterous larvæ. When that paper was prepared, I had, however, no opportunity to study the food of the young of any members of the Salmonidæ, to which the white-fish belongs, neither could I learn that any such studies had been made by others; and I could only infer the same fact with regard to this family from the general character of the results obtained by the study of the other groups. Even this inference, however, was rendered doubtful by the discovery that the youngest individuals of two of the toothless families (Catostomidæ and Cyprinidæ) were not strictly dependent upon the food elements above mentioned, but were likewise able to draw upon much smaller organisms; namely, the minutest Protozoa and unicellular Alga; and as the adult white-fish is likewise destitute of teeth, it was not by any means certain that their young would not fall under the latter category. Upon looking up the literature of the subject, I found that although the food of the adult had been very well made out in a general way,* only two items had been published respecting the food of the young. In the report of the United States Fish Commission for 1872–73, an assistant commissioner, Mr. J. W. Milner, made some experiments on young white-fish hatched artificially, supplying them with a number of articles of food, in the hope of finding something suitable for their nourishment.

"A few crawfish," he says, "were procured and pounded to a paste, and small portions put into jar No. 1; the young fish ate it readily. They were fed at night, and the next morning every one of them was found to be dead. Jar No. 2 was supplied with bread crumbs, and the fish were seen to take small particles in their mouths; they did not die so suddenly. Jar No. 3 was supplied with sweet cream, but no evidence was afforded that the occupants fed upon it. A quantity of rain-water was exposed to the rays of the sun for the purpose of generating minute forms of life, and a teaspoonful was

* Report of the U. S. Fish Commission for 1872-73, pp. 44-46.

poured into jar No. 5, morning and evening, in the hopes that their proper food was of this character. In jar No. 5, a variety of food was provided, dry, fresh beef, milk, boiled potato, and bread. The crumbs of bread and the scrapings from the beef were all that the fish were seen to take into their mouths. They died, one after another, very rapidly, and in a few days all were dead." He further remarks: "This difficulty of procuring a suitable food for the young white-fish has been the experience of the few fish-culturists who have hatched them."

With the hope of ascertaining the natural food of these fishes, a few specimens, representing young captured in the Detroit River, and others from the hatchery, were submitted by Mr. Milner to Mr. S. A. Briggs, a microscopist, of Chicago. Four examples were examined by Mr. Briggs, two from each of the above situations. Those from the hatchery contained nothing whatever, while those from Detroit River contained numerous specimens of Diatomaceæ: viz. *Fragilaria capucina* and *Stephanodiscus niagaræ*. The only fact at that time known would consequently indicate that the earliest food of the species consisted of Diatomaceæ.

The white-fish, as is well known, lays its eggs in the open lake in autumn, the young not appearing until early in the following spring. At this cold and stormy season in the exposed situations where they are to be sought, it is practically impossible to find the young fish; a fact which rendered the study of their earliest food a subject of unusual difficulty. There seemed, in fact, no practicable way to reach satisfactory conclusions upon it except by experiment upon individuals artifically hatched.

In December, 1880, I made an arrangement, through the kindness of Prof. Baird, of the Smithsonian Institution, with Mr. F. N. Clark, superintendent of the U. S. fish hatchery at Northville, Mich., for a supply of young white-fish to be sent me at intervals from the hatchery under his control. The specimens furnished were taken from two lots. The fishes of one lot, hatched January 18, were kept in a tank in the hatchery, where they were supplied with water from a spring, which had been cooled by exposure to the air in artificial ponds before entering the hatchery, in order to retard the development of the fry. The ordinary range of temperature in the tank was from thirty-five to thirty-nine degrees. These fishes were fed daily with a paste made by grinding small amphipod crustaceans (Gammarus) in a mortar.

The second lot, hatched January 20, was kept, unfed, in a perforated tin box, in a rivulet flowing from a spring, about sixty feet from its source. The water had a uniform temperature of forty-seven degrees.

Those in the spring being in warmer water than the others, developed much more rapidly, and it was believed that the character and source of this water was such as to furnish them at least a small supply of such food as young fishes are accustomed to appropriate.

Ninety specimens were received from the hatchery February 9, at which time they were three weeks old. They were thirteen mm. (half an inch) in length by one in depth. The egg-sac was but

partially absorbed in most of the lot, but in those most advanced was represented by an oil globule back of the head. The pectoral fins were well developed, but no trace of the ventrals had as yet appeared. The single median fin extended well in front of the vent, and forwards on the back nearly to the head. The opercles did not fully cover the gills. The most highly developed specimens—those whose gill-sacs had nearly disappeared—had, at a short distance on either side of the symphysis of the lower jaw, a sharp, strong, raptatorial tooth, curved backwards and slightly inwards. The base of this tooth was very broad, and the point acute and slender. At a point behind each of these teeth about half their distance from each other, was a second much smaller tooth, directed almost exactly inwards. The upper jaw was, however, wholly toothless.

These fishes were all passed under the microscope, after having been rendered transparent, but only four of them contained anything whatever: three a little dirt, and the fourth a minute fragment of the crust of the Gammarus, with which they had been fed.

Of one hundred and eleven specimens received February 17, seventeen had taken food. I dissected nine of these and found fragments of Gammarus and nothing else. Ninety specimens from the same lot were examined February 25, and food was found in fourteen. Four of these had eaten Gammarus fragments; two, larvæ of gnats; one, a small Cypris; and eight contained small fragments of the leaves and stems of vascular plants, including a bit of netted-veined leaf and a little piece of pine wood. Thirty-nine specimens, the last of the lot, were received March 15, and food was found in fourteen. I dissected nine of these, finding fragments of Gammarus in four, a larva of a gnat, a Chironomus larva, a larva of some undetermined fly, a minute vegetable fragment, a Cyclops, a Cypris, and an undetermined Entomostracan each in one. Three hundred and forty fry from the hatching house were examined in all, in forty seven of which (fourteen per cent.) more or less food was discernible. Of the thirty-five dissected, eighteen had eaten Gammarus fragments; five, minute insect larvæ; four, Entomostraca, and eight, small particles of vegetation.

Only four lots were received from the spring, on the 9th, 14th, 17th and 25th of February, after which all died of starvation. In the first hundred only one was found which had taken food, and this had eaten a trace of filamentous Algæ and a minute fragment of the parenchyma of some higher plant, with a few diatoms. But one of the second hundred contained even a trace of food, a minute quantity of some thread-like Alga, the cells of which still contained a little chlorophyll. In the third hundred, likewise, food was found in but one. This consisted of a few particles of vegetable parenchyma, doubtless derived from the decaying plant structures in or around the water. In the third lot of only forty-two specimens, six showed traces of food, consisting almost entirely of a few filamentous Algæ (including a fragment of Oscillatoria) and a little vegetable parenchyma. Desmids and diatoms were observed in trivial numbers.

The total number received from the spring was two hundred and forty-two, of which but eight were found to have eaten anything (a little over three per cent. of the whole), and these had taken only Algæ and vegetable fragments.

An example of the water of the spring sent me contained many Algæ, but no animals larger than rotifers. The water of the hatchery, being exposed in ponds of considerable size, afforded a better opportunity for the development of animal life, to which fact was doubtless due the occurrence of insect larvæ and Entomostraca in the intestines of the fishes reared in it. The situation of the spring, on the other hand, was particularly unfavorable, as it was under the hatchery, and consequently in the dark.

The observations above described on the specimens kept in spring water, have but little value, for the reason that evidently very little food was contained in the water flowing through their cage. The vegetation in the streams being chiefly filamentous Algæ, and the number of Entomostraca apparently trivial, very little of either vegetable or animal food could reach the little prisoners. It is not surprising, therefore, that notwithstanding their greater age and the higher temperature of the water in which they were kept, a much smaller ratio of the specimens had taken food than of those captured in the hatchery. From the contents of their intestines we can only infer that these fishes, reduced to a desperate strait by starvation, will snatch at almost anything contained in the water. The result obtained by a study of those from the hatching house was more significant, but still unsatisfactory. It seems to indicate that in confinement white-fish fry will feed upon both animal and vegetable structures to some extent, and that they can be induced to take minute fragments of the higher crustaceans, but not in sufficient quantity to keep them alive. The fact that animal food was more abundant than vegetable in this last lot, indicates nothing of their natural preference, since it was doubtless also more abundant in the water containing them.

More light was thrown upon the earliest food habits of these fishes by the discovery of raptatorial teeth upon the lower jaw than by these dissections of their alimentary canals. All the families of fishes which I had previously studied whose young were provided with teeth, were found strictly dependent at first upon Entomostraca and the minuter insect larvæ, while only those whose young were toothless fed to any considerable extent upon other forms. The discovery of teeth in the young white-fish, therefore, placed this species definitely in the group of those carnivorous when young. The fact that the adult was itself toothless interfered in no way with this inference, because other toothless fishes (Dorosoma) whose young were furnished with teeth had been found carnivorous at an early age.

The inconclusive character of the results thus far obtained, made it necessary to attempt to imitate more closely the natural conditions of the young when hatched in the lake. In February, 1881, I obtained, through the kindness of Mr. Clark, twenty-five specimens of living young white-fish, saved from a lot which he was planting in the waters of Lake Michigan, off Racine, Wisconsin.

I succeeded in conveying these to the laboratory without loss, and there kept them for several days in a glass aquarium and supplied them with an abundance of the living objects to be obtained by drawing a fine muslin net through the stagnant pools of the vicinity. These consisted of many diatoms and filamentous fresh-water Algæ, of two or three species of Cyclops, of *Canthocamptus illinoisensis*, and *Diaptomus sanguineus* among the Copepoda, and of two rather large Cladocera, *Simocephalus vetulus* and *S. americanus*. These little fishes were kept under careful observation for several days, the water in the aquarium being frequently aërated by pouring. Many of them had, however, been injured by handling, and eleven of the specimens died without taking food. It was soon evident that the larger Entomostraca (the Simocephalus, and even the Diaptomus), were quite beyond the size and strength of these little fishes, and that only the smaller Copepoda among the animals available, could afford them any food at first. These they followed about from the beginning with signs of peculiar interest, occasionally making irresolute attempts to capture them. Two days after their arrival, one of the young white-fish had evidently taken food, which proved, on dissection, to be a small Cyclops. During the next two days nine others began to eat, dividing their attentions between the Cyclops above mentioned and the Canthocamptus, and on the 22d two others took a Cyclops each and a third a Canthocamptus. One of these fishes contained still a large remnant of the egg-sac, showing that the propensity to capture prey must antedate the sensation of hunger. On the 25th the fourteenth and last remaining fish captured its Cyclops and was itself sacrificed in turn. As an indication of the efficiency of the raptatorial teeth, it may be worth while to note that I saw one of the smallest fishes make a spring at a Cyclops, catch it, give three or four violent wriggles, and drop it dead to the bottom of the tank.

As a general statement of the result of the observations made on these fourteen fishes, we may say that eight of them ate a single Cyclops each, that one took two, and another three of the same, that one took a single Canthocamptus, that two specimens captured two each of this genus, and that finally, a single fish ate Cyclops and Canthocamptus both. The final conclusion was a highly probable inference that the smallest Entomostraca occurring in the lake would prove to be the natural first food of the species.

In order to test this conclusion with precision, I arranged a similar experiment on a larger scale and under more natural conditions. Through the generosity of the Exposition company, of Chicago, I was allowed the use of one of the large aquarium tanks in the exposition building on the lake shore, and by the repeated kindness of Mr. Clark, of Northville, Michigan, I was furnished with a much larger number of living white-fish. Five thousand fry were shipped to me in a can of water, but through unfortunate delays in changing cars at intermediate points, about two thirds of these were dead when they reached my hands. Those living were immediately transferred to the tank, through which the water, taken from the city pipes, had already been allowed to run for several hours. As this water is derived from Lake Michigan at a distance of two miles

from the shore, and had at this time the exact temperature of the open lake, the conditions for experiment were as favorable as artificial arrangements could well be made.

Sending a man with a towing net out upon the lake with a boat, or upon the remotest breakwaters, immense numbers of all organic objects in the water were easily obtained. After enclosing the exit of the tank with a fine wire screen, to prevent the escape of objects placed in it, we poured these collections of all descriptions indiscriminately into the water from day to day, thus keeping the fishes profusely supplied with all the various kinds of food which could possibly be accessible to them in their native haunts. From this tank one hundred fishes were taken daily and placed in alcohol for dissection and microscopic study, to determine precisely the objects preferred by them for food. These were examined at a later date, and all contents of the intestines were mounted entire as miscroscopic slides, and permanently preserved. A careful study, was of course made of the organisms of the lake, as shown by the product of the towing net, and when the experiment was finally ended, an equally careful examination followed of the living contents of the water of the tank at that time.

These fishes, like those previously described, had already reached the age and condition at which it is customary to "plant" them in the lake. The ventrals were still undeveloped, the egg-sac had nearly disappeared, the four mandibular teeth were present, and the median fin extended from the tips of the pectorals on the belly to a point opposite the middle of the same fins on the back. In most the egg-sac did not protrude externally, being reduced in some to a droplet of oil, but remaining in a few of a size at least as great as as that of the head. The alimentary canal was, of course, a simple straight tube, without any distinction of stomach and intestine.

The sufferings of these fry in transit had doubtless weakened the vitality of the survivors, and although every care was taken to keep the water of the tank fresh and pure, about one third of those remaining died during the progress of the experiment. The aquarium in which they were confined was built of glass, and had a capacity of about one hundred cubic feet. The temperature, tried repeatedly, stood at forty-two degrees Fah. A steady current of the water of the lake was maintained through this tank, entering through a rose, from which it fell in a spray, thus insuring perfect aëration.

By far the greater part of the organic contents of the water of the lake, as shown by the product of the towing net, consisted of diatoms in immense variety, which formed always a greenish mucilaginous coating upon the interior of the muslin net. In this were entangled a variety of rotifers, occasional filamentous Algæ, and many Entomostraca, the latter belonging chiefly to the genera Cyclops, Diaptomus, and Limnocalanus among the Copepoda, and to Daphnia among the Cladocera.

As the Entomostraca proved to be far the most important elements of this food supply, the particulars respecting them may be properly more fully given. The smallest of all was a Cyclops, then

new, but since described by me under the name of *Cyclops thomasi*.* This little entomostracan is only .04 inch long by .011 wide. The next in size, and by far the most abundant member of this group was a Diaptomus, likewise new, described in the paper just cited under the name of *Diaptomus sicilis*. This appears in two forms, one evidently young in the stage just preceding the adult. Full-grown individuals were .065 inch long by one fourth that depth. The Limnocalanus was a much larger form, evidently preying, to a considerable extent, upon the two just mentioned. All the Cladocera noticed were *Daphnia hyalina*, an elegant and extremely transparent species, occurring likewise in the lakes of Europe. A single insect larval form (Chironomus) should likewise be mentioned in this connection, since it had about the same size and consistence of the Entomostraca, and was consequently equally available for food.

The specimens of each of the above species from a certain quantity of these collections were counted, in order to give a definite idea of their relative abundance in the lake. The Diaptomus numbered 225, the Cyclops 75, Limnocalanus 7, Daphnia 3 and Chironomus larvæ 1. It was a curious fact, however, that when the water was drawn off at the end of the experiment more than half the Entomostraca were Limnocalanus; a fact partly to be explained by the predaceous habit of the latter, and partly by the facts relating to the food of the fishes themselves, which are presently to be detailed.

The fry were placed in the tank and supplied with their first food on the evening of the 12th of March. On the 14th one hundred specimens were removed, and twenty-seven of these were dissected. Twenty were empty, but the remaining seven had already taken food, all Cyclops or Diaptomus. Three had eaten Cyclops only and six Diaptomus, while two had eaten both. Fourteen of these Entomostraca, seven of each genus, were taken by these seven fishes. From those captured the next day twenty-five specimens were examined, of which nineteen were without food. Of the remaining six, three had eaten of Diaptomus and three Cyclops; five of the former being taken in all, and ten of the latter. Three specimens were next examined from those caught on the 19th of March, two of which had devoured Diaptomus, and a third a single *Cyclops thomasi* and a shelled rotifer, *Anuræa striata*. The character of the food at these earliest stages was so well settled by these observations that I deemed it unnecessary to examine the subsequent lots in detail, but passed at once to the specimens taken on the 23d. Twenty-six of these were examined, and found to have eaten thirty-three individuals of *Cyclops thomasi*, fourteen of *Diaptomus sicilis*, and fourteen of the minute rotifer already mentioned (*Anuræa striata*). Two had taken a few diatoms (*Bacillaria*), and one had eaten a filament of an Alga. Cyclops was found in sixteen of the specimens, Diaptomus in nine and Anuræa in eight, only two of them being empty. The amount of food now taken by individual fishes was much greater than before, one specimen dissected having eaten two Cyclops and six *Diaptomus sicilis*, male and female. Another

* On some Entomostraca of Lake Michigan and Adjacent Waters. American Naturalist, Vol. XVI, No. VIII, August, 1882, pp. 640 and 649.

had taken five Cyclops, one Diaptomus and five examples of *Anuræa striata*. Still another had eaten four of the Cyclops, four Diaptomus, and one Anuræa.

Twenty-five specimens were examined from those removed on the 24th of the month, at which time the water of the tank was drawn off, and all the remaining fishes bottled. Four of these had not eaten, but the twenty-one others had devoured fifty specimens of *Diaptomus sicilis*, forty-seven of *Cyclops thomasi*, fourteen of *Anuræa striata*, and a single *Daphnia hyalina*, the latter being the largest object eaten by any of the fishes. A few examples of their capacity may well be given. The ninth example had eaten six Diaptomus, two *Cyclops thomasi* and one Anuræa; the tenth had taken eight Diaptomus, two Cyclops, and an Anuræa; and the twentieth, seven Diaptomus and three *Cyclops thomasi*. In two of these examples were small clusters of orange globules, probably representing unicellular Algæ.

Summarizing these data briefly, we find that of the 106 specimens dissected, sixty-three had taken food, and that the ratio of those which were eating increased rapidly, the longer the fishes were kept in the aquarium. Only one fourth of those examined on the fourteenth of the month had taken food, while more than five sixths of those bottled ten days later had already eaten. The entire number of objects appropriated by these sixty-three fishes was as follows: *Cyclops thomasi*, ninety-seven; *Diaptomus sicilis*, seventy-eight; *Anuræa striata*, twenty-nine; *Daphnia hyalina*, one. Seven of the fishes had eaten unicellular Algæ, two had eaten diatoms, and one, filamentous Algæ.

From the above data we are compelled to conclude that the earliest food of the white-fish consists almost wholly of the smallest species of Entomostraca occurring in the lake, since the other elements in their alimentary canals were evidently either taken accidentally, or else appeared in such trivial quantity as to contribute nothing of importance to their support. In fact, two species of Copepoda, *Cyclops thomasi* and *Diaptomus sicilis*, are certainly very much more important to the maintenance of the white fish in this earliest stage of independent life than all the other organisms in the lake combined. As the fishes increase in size, vigor and activity, they doubtless enlarge their regimen by capturing larger species of Entomostraca, especially Daphnia and Limnocalanus.

A few words respecting the relative abundance of these species at different seasons of the year, and their distribution in the lake, will have some practical value. We may observe here an excellent illustration of the remarkable uniformity of the life of the lake as contrasted with that of smaller bodies of water already referred to in the introduction to this paper. While in ponds minute animal life is largely destroyed or suspended during the winter, the opening spring being attended by an enormous increase in numbers and rate of multiplication, in Lake Michigan there is but little difference in the products of the collecting apparatus at different seasons of the year.*

*For definite assurance of this fact, I am indebted less to my own observations (which are, however, consistent with it as far as they go) than to the statements of B. W. Thomas, Esq., of Chicago, who, while making a specialty of the Diatomaceæ of the lake, has collected and studied all its organic forms for several years, obtaining them from the city water by attaching a strainer to a hydrant many times during every month throughout the year.

There is a slight increase in the number of individuals during the spring and early summer, but scarcely enough appreciably to affect the food supply of fishes dependent upon them. They are not by any means equally distributed, however, throughout the lake, my own observations tending to show that there are relatively very few of these minute crustaceans to be found at a distance of a few miles from shore, and that in fact by far the greater part of them usually occur within a distance of two or three miles out. Indeed, the mouths of the rivers flowing into the lake are ordinarily much more densely populated by these animals than the lake itself, as has been particularly evident at Racine and South Chicago. Neither are they commonly equally distributed throughout the waters in which they are most abundant, but like most other aquatic animals, occur in shoals. In the deeper portions of the lake, many species shift their level according to the time of day, coming to the surface by night, and sinking again when the sun is bright.

These facts make it important to the fish-culturist that the particular situation where it is proposed to plant the fry should be searched at the time when these are to be liberated, to determine whether they will find at once sufficient food for their support. A little experience will easily enable one to estimate the relative abundance of the Entomostraca at any given time and place, and they require nothing for their capture more complicated or difficult of management than a simple ring net of cheese-cloth or similar material, towed behind a boat. This may be weighted and sunk to any desired depth, so that the contents of the water either at the surface or at the bottom, may be ascertained by a few minutes' rowing.

In conclusion, I wish again to express my great obligation to the United States Fish Commissioner, Prof. S. F. Baird, and to Frank N. Clark, Superintendent of the United States Hatchery at Northville, Mich., through whom, as already stated, the specimens were derived upon which these studies were made. My best thanks are also due to the Exposition company of Chicago, and especially to their Secretary, the Hon. John P. Reynolds, for the use of a tank in the Exposition building, and for many courtesies received while the experiment there was in progress.

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